

PLEISTOCENE FOSSIL VERTEBRATE SITES OF THE SOUTH EAST REGION OF SOUTH AUSTRALIA

by E. H. REED¹ & S. J. BOURNE²

Summary

REED, E. H. & BOURNE, S. J. (2000) Pleistocene fossil vertebrate sites of the South East region of South Australia. *Trans. R. Soc. S. Aust.* 124(2), 61-90, 30 November, 2000.

This paper provides a summary of the Pleistocene vertebrate fossil sites of the South East region of South Australia and builds upon an earlier paper by Williams (1980). It also provides the first detailed review of all known Pleistocene faunal sites of the Naracoorte Caves World Heritage Area. Each known site in the region is listed with details of the site and faunal assemblage, fossil collections made from it and references to previous literature. The representation of the major vertebrate groups in the Pleistocene sites of the South East and the level of scientific attention they have received are discussed.

KEY WORDS: Vertebrate palaeontology, caves, South East, Naracoorte, South Australia, Pleistocene, Quaternary, vertebrate fossils.

Introduction

The South East region of South Australia (Fig. 1) is predominantly a karst terrain characterised by features such as dolines, caves and cenotes (sinkholes). The Oligocene to Miocene Gambier and Naracoorte limestones of the South East contain numerous caves, with more than 170 having been recorded for the Upper South East and more than 400 in the Lower South East (Lewis 1979¹; Matthews 1985; K. Mott pers. comm. 1999). Many of these caves contain skeletal material of Pleistocene vertebrates. These sites have received much scientific attention and will be the main focus of this paper. Williams (1980) published the first catalogue of Pleistocene vertebrate fossil sites of South Australia, but listed only a small number of sites for the South East. Palaeontological research in the region has been steadily increasing since 1980, particularly on sites in the Naracoorte Caves World

Heritage Area and surrounds. Thus, with further research, ongoing cave exploration and, most recently, vineyard development new cave sites have been discovered highlighting the need to review the fossil sites of the region in depth. The current paper builds on Williams' (1980) study and includes sites that were only under preliminary investigation at that time, sites omitted by that author and those discovered and investigated more recently by the present authors and the palaeontological research team at Flinders University. This study originated as part of the PhD studies of one of us (E H R).

The majority of the sites discussed in this paper are in caves. Various modes of bone accumulation have been suggested, including natural traps and predator accumulations (Smith 1971, 1972; Pledge 1980a, 1990; Wells *et al.* 1984; Baird 1985; Newton 1988²; Barrie 1997; Brown 1998³; Brown & Wells 2000; Moriarty *et al.* 2000). Many of the sites display multiple and overlapping accumulation modes. Less common in the region are surface sites and others such as the accidental finds where drilling of bores or construction works have led to discoveries (Wells & Pledge 1983). Several of the fossil deposits in the region have been extensively researched, such as those of Henschke's Fossil Cave (5U91, 5U97), Green Waterhole Cave (5L81) and the Victoria Fossil Cave (5U1) in which research has been continuous for almost 30 years (Smith 1971, 1972, 1976; Van Tets & Smith 1974; Wells 1975; Wells *et al.* 1984; Moriarty *et al.* 2000). Other caves such as Wombat Cave (5U58) have received little more than preliminary investigation, while others have only been surveyed and fossils identified *in situ*, e.g. Rabbit Cave (5U66). Some of these cave sites no

¹School of Biological Sciences, The Flinders University of South Australia GPO Box 2100 Adelaide SA 5001. E-mail: liz.reed@flinders.edu.au

²Naracoorte Caves Conservation Park, PO Box 134 Naracoorte SA 5271.

³Lewis, I. D. (1979) 'South Australian Cave Reference Handbook, Occasional Paper No. 5' (Cave Exploration Group of South Australia, Adelaide).

⁴NEWTON, C. A. (1988) A taphonomic and palaeoecological analysis of the Green Waterhole (5L81), a submerged late Pleistocene bone deposit in the lower southeast of South Australia. BSc (Hons) Thesis, The Flinders University of South Australia (unpub.).

⁵BROWN, S. P. (1998) A geological and palaeontological examination of the Pleistocene Cathedral Cave fossil accumulation, Naracoorte, South Australia. BSc (Hons) Thesis, The Flinders University of South Australia (unpub.).

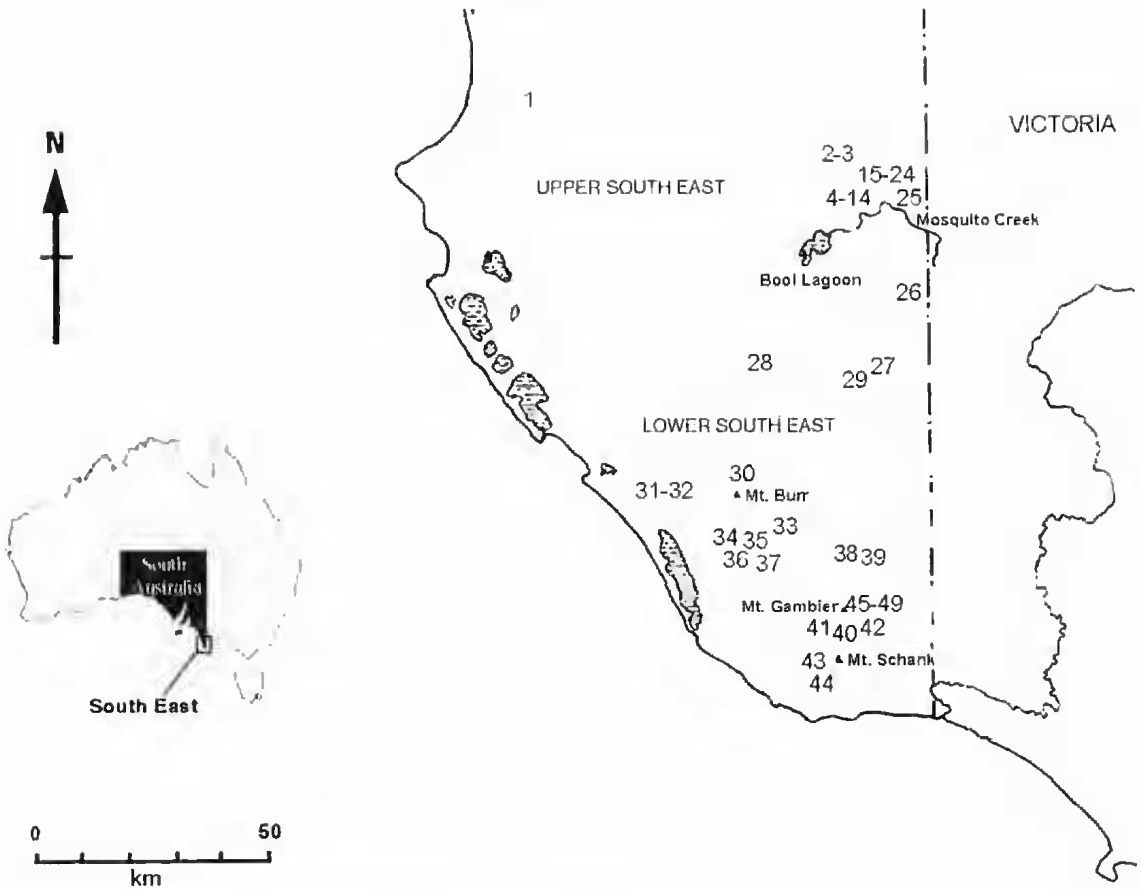


Fig. 1. Map of the South East of South Australia, with sites marked by a Number corresponding to those mentioned in the text. Divisions of Upper and Lower South East sub-regions are indicated.

longer exist, due to land development and others are yet to be fully explored. This paper is up-to date as of 31 July 2000 but research in the region is continuing, particularly in the Naracoorte Caves World Heritage Area.

This paper is not intended for use as a biogeographical database but simply provides faunal lists for each of the sites, along with some background information. Due to differing chronological sequences, it should not be assumed they are contemporaneous. The main aim of the paper is to report on new sites in the region, to highlight their significance and to provide more up to date faunal lists, particularly for sites within the Naracoorte Caves World Heritage Area.

The Naracoorte Caves World Heritage Area

The presence of bone material in the caves of Naracoorte was recognised soon after the discovery of Blanche Cave in 1845 (Wells & Pledge 1983). The

first significant work on vertebrate fossils from the region was carried out by Woods in 1857 and 1858, and recorded in his book "Geological Observations in South Australia" (Woods 1862). Later, vertebrate fossils were reported from Specimen Cave by Stirling (Stirling 1908, 1912; Wells & Pledge 1983). Very little palaeontological research was subsequently undertaken in the region until the 1960s, when material from Haystack Cave and Henschke's Fossil Cave was investigated (Merrilees 1965; Pledge 1980e; Barrie 1997). The discovery in 1969 of the Fossil Chamber in Victoria Fossil Cave (then known as Victoria Cave) and subsequent fossil discoveries in other caves of the Naracoorte Caves Conservation Park, led to an upsurge in research activity in the region and a growing awareness among the scientific community of its importance.

The significance of the Pleistocene fossil deposits of the Naracoorte Caves Conservation Park was recognised internationally in 1994 when the Park was inscribed on to the World Heritage List. The

Naracoorte Caves deposits, together with Riversleigh in Queensland, form the Australian Fossil Mammal Sites. The Pleistocene faunal record at the Naracoorte Caves is extensive, the caves having acted as pitfall traps and owl roosts, collecting examples of the fauna of this small geographic region over at least the last 400,000 years (Ayliffe *et al.* 1998; Brown 1998²; Brown & Wells 2000; Moriarty *et al.* 2000). Within the World Heritage Area, 11 of the 26 caves have yielded vertebrate bone material. When combined with recent climatic and geochronological work, the potential of the bone material for resolving palaeoecological and other contentious issues, such as the timing of the megafaunal extinctions, is considerable (Ayliffe *et al.* 1998; Moriarty *et al.* 2000).

Materials and Methods

The list of sites and faunas provided in this paper has been compiled from the collections and records of the South Australian Museum and the Flinders University vertebrate palaeontology laboratory, current research, published literature, personal communication with researchers studying sites in the region and field research by the authors. The locations of the fossil sites discussed in this paper are shown in Fig. 1. Their numbers correspond to site numbers given in the lists of sites and faunas provided and in Table 3. The format is similar to that of Williams (1980) but additional information, including site details and current research is provided for each site. Cave numbers (i.e. Cave Exploration Group of South Australia CEGSA registration numbers) follow those of Lewis (1979¹), Mathews (1985) and current CEGSA records. For these numbers 'S' indicates the state of South Australia and 'U' or 'L' upper or lower South East sub-region. The division into Upper and Lower sub-regions used in this paper (Fig. 1) conforms with the CEGSA divisions for cave locations. Within these sub-regions sites have been grouped according to district, determined by the authors as encompassing an approximately 25 km radius of the major townships of the South East. The Naracoorte Caves World Heritage Area is presented separately from the Naracoorte district. Site names follow Williams (1980), CEGSA records and the published literature. The storage location of fossil collections from each site is also included, as are the sources for the information presented. Sites under investigation by the authors are identified.

Systematics

Checklists of faunas represented in the Pleistocene deposits described in this study are presented in Tables 1 & 2. Table 3 shows the distribution of species between the sites presented in the main text. Phylogenetic order for marsupials follows Apfm & Archer (1987). Robinson *et al.* (2000) are followed for placental mammals, reptiles, amphibians and birds. Names, taxonomic authorities and distributional data were taken primarily from Robinson *et al.* (2000), with some additional information taken from Strahan (1995) for mammals, Cogger (2000) for reptiles and amphibians and Pizzey & Knight (1997) for birds. Names and authorities for fossil species follow Archer *et al.* (1984) for mammals, Baird (1985), Van Tais & Smith (1974) and Stirling & Zietz (1896) for birds, and Smith (1976) for the fossil reptile *Wonambi naracoortensis*. References for authorities for names published subsequently are included in the References section of this paper. Distributional and survival status changes are indicated for each species in the list of sites and the faunal checklists (Tables 1 & 2), with *† referring to species which became extinct during the Pleistocene, *‡ referring to historically extinct species, and * indicating those species which are locally extinct, or currently not found in the South East region.

Faunal names used in the faunal lists conform with current usage. Nomenclatural changes that affect species included in this paper are summarised in Table 4. This table lists the current name (as used in this paper), the previous name as it appeared in earlier publications for Pleistocene sites of the South East and the relevant references. Changes in identification of fossil specimens are noted in the faunal lists with appropriate references given.

Williams (1982³) provided revised diagnoses for the genus *Dipromodon*. He listed *†*Dipromodon australis* and *‡*D. optatum* as separate species. The identification provided for site 32 conforms with Williams' diagnoses (R. Wells pers. comm. 2000). Smith (1972) identified **Antechinus stuartii* from site 4a. Subsequent work has changed the concept of the modern species of **A. stuartii* and populations formerly included in **A. stuartii* actually comprise two sibling species, **A. stuartii* and **A. agilis* (Dickman *et al.* 1988; Dickman 1998). On the basis of modern ranges (Strahan 1995), any identification of **A. stuartii* from Pleistocene fossil deposits of the South East is likely to be the newly recognised **A. agilis* rather than the true **A. stuartii*.

Results

The following list of sites and faunas provides a

²WILLIAMS, D. L. G. (1982) The late Pleistocene of the Flinders and Mt Lofty Ranges. PhD Thesis, The Flinders University of South Australia (unpub.).

TABLE 1. Checklist of amphibian, reptile and bird species identified or tentatively identified from Pleistocene fossil sites of the South East of South Australia.

CLASS AND ORDER	FAMILY AND SUB-FAMILY	GENUS AND SPECIES
AMPHIBIA		
ANURA	Hylidae (Tree frogs) Myobatrachidae (Southern Frogs)	<i>Litoria ewingi</i> (Duméril & Bibron, 1841) <i>Crimia signifera</i> (Girard, 1853) <i>Geocrinia laevis</i> (Günther, 1864) <i>Limnodynastes dumerili</i> Peters, 1863 <i>Limnodynastes tasmaniensis</i> Günther, 1858
REPTILIA		
TESTUDINES	Chelidae (Side-necked Tortoises)	<i>Chelodina longicollis</i> (Shaw, 1794) * <i>Emydura macquarii</i> (Gray, 1830)
SQUAMATA	Agamidae (Dragon lizards) Scincidae (Skinks)	<i>Pogona barbata</i> (Cuvier, 1829) <i>Egernia whitii</i> (Lacépède, 1804) <i>Eulamprus tympanum</i> (Lonnberg & Andersson, 1913) <i>Levisia bougainvillii</i> (Gray, 1839) <i>Tiliqua nigrolutea</i> (Quoy & Gaimard, 1824) <i>Tiliqua rugosa</i> (Gray, 1825)
	Varanidae (Goannas)	* <i>Varanus gouldii</i> (Gray, 1838) * <i>Varanus varius</i> (White, ex Shaw, 1790) *† <i>Wouambi naracoortensis</i> Smith, 1976
	Madtsoiidae (Madtsoiid snakes)	
	Elapidae (Elapid snakes)	<i>Notechis scutatus</i> (Peters, 1861) * <i>Pseudechis porphyriacus</i> (Shaw, 1794) <i>Pseudonaja unchalix</i> Günther, 1858
AVES		
STRUTHIONIFORMES	Casuariidae (Cassowaries & Emus) Dromornithidae (Dromornithids)	<i>Dromains novae-hollandiae</i> (Latham, 1790) *† <i>Genyornis newtoni</i> Stirling & Zietz, 1896
GALLIFORMES	Megapodiidae (Megapodes) Phasianidae (Pheasants, quails & allies)	<i>Leipoa ocellata</i> Gould, 1840 *† <i>Progora naracoortensis</i> Van Tets, 1974 <i>Coturnix pectoralis</i> Gould, 1837 <i>Coturnix ypsilophora</i> Bosc, 1792 Gen. et sp. indet.
ANSERIFORMES	Anatidae (Geese, swans & ducks)	
PELICANIFORMES	Phalacrocoracidae (Cormorants)	<i>Phalacrocorax melanoleucos</i> (Vicillot, 1817)
FALCONIFORMES	Accipitridae (Osprey, hawks, eagles & allies)	<i>Accipiter</i> Brisson, 1760 sp. indet. <i>Aquila audax</i> (Latham, 1802) <i>Falco berigora</i> Vigors & Horsfield, 1827
GRUIFORMES	Falconidae (Falcons) Rallidae (Rails, crakes & allies)	* <i>Gallinula mortierii</i> (Du Bus, 1840) <i>Gallinula tenebrosa</i> Gould, 1846 <i>Gallirallus philippensis</i> (Linnaeus, 1766)
TURNICIFORMES	Turnicidae (Button-quails)	<i>Turnix varia</i> (Latham, 1802)
CHARADRIIFORMES	Pedionomidae (Plains-wanderer) Scolopacidae (Sandpipers & allies) Gallinagininae Tringinae Calidrinae Burhinidae (Stone curlews) Charadriidae (Plovers & dotterels)	* <i>Pedionomus torquatus</i> Gould, 1840 <i>Gallinago hardwickii</i> (Gray, 1831) <i>Tringa glareola</i> Linnaeus, 1758 <i>Calidris ruficollis</i> (Pallas, 1776) <i>Burhinus grallarius</i> (Latham, 1802) * <i>Charadrius australis</i> (Gould, 1841)
COLUMBIFORMES	Columbidae (Pigeons & doves)	<i>Phaps chalcoptera</i> (Latham, 1790)

PSITTACIFORMES	Cacatuidae (Cockatoos & cockatiel)	<i>Cacatua tenuirostris</i> (Kuhl, 1820) <i>Callocephalon fimbriatum</i> (Grant, 1803) <i>Calyptorhynchus banksii</i> (Latham, 1790) * <i>Calyptorhynchus lathamii</i> (Temminck, 1807) * <i>Pezoporus wallius</i> (Kerr, 1792) <i>Platyercus</i> Vigors, 1825 sp. indet.
	Psittacidae (Parrots)	*† <i>Centropus colossus</i> Baird, 1985 <i>Ninox novaeseelandiae</i> (Gmelin, 1788) <i>Tyto alba</i> (Scopoli, 1769) <i>Tyto novaehollandiae</i> (Stephens, 1826) <i>Docelo novaeguineae</i> (Hermann, 1783)
CUCULIFORMES	Cuculidae (Cuckoos)	
STRIGIFORMES	Strigidae (Typical owls)	
	Tytonidae (Barn Owls)	
CORACIIFORMES	Alcedinidae (Kingfishers, bee-eaters & rollers)	
PASSERIFORMES	Acanthizidae (Bristlebirds, thornbills, scrubwrens & allies)	<i>Dasyornis broadbenti</i> (McCoy, 1867)
	Meliphagidae (Honeyeaters & Australian chats)	<i>Mamorina melanocephala</i> (Latham, 1802)
	Orthonychidae (Chowchillas, quail-thrushes & allies)	*† <i>Orthonyx hypsilophus</i> Baird, 1985
	Dicruridae (Monarchs, drongos, magpie-larks & allies)	<i>Grallina cyanoleuca</i> (Latham, 1802)
	Artamidae (Woodswallows, butcherbirds & allies)	<i>Gymnorhina tibicen</i> (Latham, 1801)
	Corvidae (Crows)	<i>Corvus</i> Linnaeus, 1758 sp. indet.
	Hirundinidae (Swallows & martins)	<i>Hirundo neoxena</i> Gould, 1842
	Estrildidae (Grass-finches)	Gen. et sp. indet.

Incomplete identifications are included only if they represent the only entry representing the family or genus concerned. *† indicates species extinct during the Pleistocene, ** indicates historically extinct taxon, ♂ indicates taxon no longer occurs in the region.

catalogue of all known Pleistocene fossil vertebrate sites and faunas of the South East.

Sites and Faunas of the Upper South East region

Kingston district

1. BLACKFORD DRAIN

LOCATION: 21 km NE of Kingston.

SITE DESCRIPTION: Fossils were uncovered in the north side of the creek-bed during bridge construction in 1954 in a bed of "waterworn stones" at a depth of approximately 3.5 - 4.5 m (Williams 1980). A letter from R. V. Flint accompanying the specimens described the lowest level as "a hard stone which looked like a flow of black mud, thickly impregnated with small white shells" (Williams 1980).

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Diprotodontidae: *†*Diprotodon* sp. indet.,

*†*Zygomaturus trilobus*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *†*Procoptodon* sp. indet., *†*Simosthenurus occidentalis*.

REFERENCES: Williams (1980); N. Pledge (pers. comm. 2000); South Australian Museum palaeontology collection records.

Naracoorte Township

2. HENSCHKE'S FOSSIL CAVE 5U91, 5U97 (also known as Henschke's Quarry Cave)

LOCATION: Outskirts of Naracoorte township at Henschke's Quarry.

SITE DESCRIPTION: The cave was exposed by quarrying and found to contain a rich and diverse fossil assemblage. It was excavated by workers from the South Australian Museum from 1969 to 1981 to salvage material from the cave, which was part of the active quarry (Pledge 1990). Subsequent excavation was carried out by J. Barrie from 1981 to 1997, investigating an extensive section radiating from the location of the earlier excavations (Barrie 1997). As quarrying has continued the cave has been completely destroyed.

TABLE 2. Checklist of mammal species identified or tentatively identified from Pleistocene fossil sites of the South East of South Australia.

CLASS AND ORDER	FAMILY AND SUB-FAMILY	GENUS AND SPECIES
MAMMALIA		
MONOTREMATA	Tachyglossidae (Echidnas or spiny anteaters)	*† <i>Megalibgwilia ramsayi</i> (Owen, 1884) <i>Tachyglossus aculeatus</i> (Shaw, 1792)
MARSUPIALIA		
DASYUROMORPHIA	Thylacinidae (Thylacines) Dasyuridae (Carnivorous marsupials)	** <i>Thylacinus cynocephalus</i> (Harris, 1808) <i>Antechinus flavipes</i> (Waterhouse, 1837) <i>Antechinus minimus</i> (Geoffroy, 1803) * <i>Antechinus stuartii</i> Macleay, 1842 * <i>Antechinus swainsonii</i> (Waterhouse, 1840) * <i>Dasyurus geoffroyi</i> Gould, 1841 * <i>Dasyurus maculatus</i> (Kerr, 1792) * <i>Dasyurus viverrinus</i> (Shaw, 1800) * <i>Ningau yvonnae</i> Kitchener, Stoddart & Henry, 1983 * <i>Phascogale calura</i> Gould, 1844 * <i>Phascogale tapoatafa</i> (Meyer, 1793) * <i>Sarcophilus harrisi</i> (Boitard, 1841) *† <i>Sarcophilus lanjarinus</i> (Owen, 1838) <i>Smynthopsis crassicaudata</i> (Gould, 1844) * <i>Smynthopsis leucopus</i> (Gray, 1842) <i>Smynthopsis murina</i> (Waterhouse, 1837) <i>Isodon obesulus</i> (Shaw, 1797) * <i>Perameles bougainville</i> Quoy & Gaimard, 1824 * <i>Perameles gummii</i> Gray, 1838
PERAMELEMORPHIA	Peramelidae (Bandicoots & bilbies)	<i>Phascolarctos cinereus</i> (Goldfuss, 1817) *† <i>Phascolarctos stirtoni</i> Bartholomai, 1968
DIPROTODONTIA	Phascolarctidae (Koalas)	
	Diprotodontidae (Large extinct marsupial quadrupeds)	
	Zygomaturinae	*† <i>Zygomaturus trilobus</i> Macleay, 1858
	Diprotodontinae	*† <i>Diprotodon australis</i> (Owen, 1844) *† <i>Diprotodon optatum</i> Owen, 1838
	Palorchestidae (Large extinct tapir-like marsupials)	*† <i>Palorchestes azael</i> Owen, 1874 *† <i>Palorchestes parvus</i> De Vis, 1895
	Vombatidae (Wombats)	* <i>Lasiorhinus krefftii</i> (Owen, 1872) * <i>Lasiorhinus latifrons</i> (Owen, 1845) <i>Vombatus ursinus</i> (Shaw, 1800) *† <i>Warendja wakefieldi</i> Hope & Wilkinson, 1982 *† <i>Thylacoleo carnifex</i> Owen, 1858
	Thylacoleonidae (Marsupial 'lions')	
	Phalangeridae (Brush-tail possums & cuscuses)	<i>Trichosurus vulpecula</i> (Kerr, 1792)
	Hypsiprymnodontidae (Sectorial-toothed rat-kangaroos)	*† <i>Propleopus oscillans</i> (De Vis, 1888)
	Potoroidae (Potoroos, bettongs & rat-kangaroos)	* <i>Aepyprymnus rufescens</i> (Gray, 1837) * <i>Bemongia gaimardi</i> (Desmarest, 1822) * <i>Bemongia lesueur</i> (Quoy & Gaimard, 1824) * <i>Bemongia penicillata</i> Gray, 1837 ** <i>Potorous platyops</i> (Gould, 1844) * <i>Potorous iridactylus</i> (Kerr, 1792)
	Macropodidae (Wallabies, kangaroos & tree-kangaroos)	
	Sthenurinae (extinct browsing kangaroos)	*† <i>Procoptodon gobioides</i> (Owen, 1846) *† <i>Procoptodon rapha</i> Owen, 1874 *† <i>Simosthenurus baileyi</i> (Prideaux & Wells, 1998) *† <i>Simosthenurus brownie</i> (Merrillees, 1968)

		*† <i>Simosthenurus gilli</i> (Merrilees, 1965)
		*† <i>Simosthenurus maddocki</i> (Wells & Murray, 1979)
		*† <i>Simosthenurus newtonae</i> Prideaux, 2000
		*† <i>Simosthenurus occidentalis</i> (Glauert, 1910)
		*† <i>Simosthenurus pales</i> (De Vis, 1895)
		*† <i>Sthenurus andersoni</i> Marcus, 1962
Macropodinae		*† <i>Congruus congruus</i> McNamara, 1994
		** <i>Lagorchestes leporides</i> (Gould, 1841)
		* <i>Lagostrophus fuscatus</i> (Péron & Lesueur, 1807)
		* <i>Macropus eugenii</i> (Desmarest, 1817)
		<i>Macropus fuliginosus</i> (Desmarest, 1817)
		<i>Macropus giganteus</i> Shaw, 1790
		** <i>Macropus greyi</i> Waterhouse, 1845
		<i>Macropus rufogriseus</i> (Desmarest, 1817)
		*† <i>Macropus titan</i> Owen, 1838
		** <i>Onychogalea lunata</i> (Gould, 1841)
		*† <i>Protemnodon anak</i> Owen, 1874
		*† <i>Protemnodon brehms</i> (Owen, 1874)
		*† <i>Protemnodon roechus</i> Owen, 1874
		* <i>Thylogale billardieri</i> (Desmarest, 1822)
		<i>Wallabia bicolor</i> (Desmarest, 1804)
Burramyidae		<i>Cercartetus concinnus</i> (Gould, 1845)
(Pygmy-possums)		<i>Cercartetus lepidus</i> (Thomas, 1888)
		<i>Cercartetus nanus</i> (Desmarest, 1818)
Pseudocheiridae (Ringtail		* <i>Petauroides volans</i> (Kerr, 1792)
Possums & Greater Glider)		<i>Pseudocheirus peregrinus</i> (Boddaert, 1795)
Petauridae (Striped Possum,		<i>Petaurus breviceps</i> Waterhouse, 1839
Leadbeater's Possum &		
wrist-winged gliders)		
Acrobatidae (Feathertail Glider)		<i>Acrobates pygmaeus</i> (Shaw, 1794)
PLACENTALIA		
CHIROPTERA	Vespertilionidae	<i>Miniopterus schreibersii</i> (Kuhl, 1817)
	(Ordinary bats)	<i>Nyctophilus geoffroyi</i> Leach, 1821
CARNIVORA	Canidae	<i>Canis lupus familiaris</i> Linnaeus, 1758
	(Dogs, foxes & allies)	<i>Vulpes vulpes</i> Linnaeus, 1758
	Felidae (Cats)	<i>Felis catus</i> Linnaeus, 1758
	Otariidae (Eared seals)	<i>Arctocephalus</i> Geoffroy & Cuvier, 1826 sp. indet.
ARTIODACTYLA	Suidae (Pig)	<i>Sus scrofa</i> Linnaeus, 1758
	Bovidae (Horned ruminants)	<i>Ovis aries</i> Linnaeus, 1758
RODENTIA	Muridae (Rats and mice)	** <i>Comilurus albipes</i> (Lichtenstein, 1829)
		<i>Hydromys chrysogaster</i> Geoffroy, 1804
		* <i>Mastacomys fuscus</i> Thomas, 1882
		<i>Notomys mitchellii</i> (Ogilby, 1838)
		<i>Pseudomys apodemoides</i> Finlayson, 1932
		* <i>Pseudomys australis</i> Gray, 1832
		* <i>Pseudomys funeus</i> Brazenor, 1934
		* <i>Pseudomys gouldii</i> (Waterhouse, 1839)
		<i>Pseudomys shortridgei</i> (Thomas, 1907)
		<i>Rattus fuscipes</i> (Waterhouse, 1839)
		<i>Rattus lutreolus</i> (Gray, 1841)
		* <i>Rattus tanneri</i> (Thomas, 1904)
LAGORMORPHA	Leporidae	<i>Oryctolagus cuniculus</i> (Linnaeus, 1758)

Incomplete identifications are included only if they represent the only entry representing the family or genus concerned. *† indicates species extinct during the Pleistocene, ** indicates historically extinct taxon, * indicates taxon no longer occurs in the region.

<i>Vombatus ursinus</i>	X X X	X	X X X X	X X	X X	X X X	X X X	X X X	X	X	X	X	X	X
*† <i>Warendja wakefieldi</i>	X X X	X X	X X X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Thylacoleo carnifex</i>	X X X	X X	X X X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
<i>Trichosurus vitupercula</i>	X X	X X X X	X X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Propleopus oscillans</i>	X cf.	X	X X X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Aepyrymnus rufescens</i>	X cf.	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Bettongia gainardi</i>	cf. X	X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Bettongia lesueur</i>	X X cf.	X X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Bettongia penicillata</i>	cf. X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
<i>Bettongia</i> sp. indet.														
**† <i>Potorous platyops</i>	cf. X	X X X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Potorous iridaclytus</i>	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Congruus congruus</i>	X X	X	X	X	X	X	X	X	X	X	X	X	X	X
**† <i>Lagorchestes leporides</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Lagostrophus fasciatus</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Macropus eugeni</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Macropus fuliginosus</i>	X	cf.	cf.	cf.	cf.	cf.	cf.	cf.	cf.	cf.	cf.	cf.	cf.	cf.
<i>Macropus giganteus</i>	X cf. X X X X	cf. cf. X X X	cf. X X X	cf. X X X	cf. X X X	cf. X X X	cf. X X X	cf. X X X	X	X	X	X	X	X
**† <i>Macropus greyi</i>	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
<i>Macropus rufogriseus</i>	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X	X	X	X	X	X
*† <i>Macropus titan</i>	X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X
<i>Macropus</i> sp. indet.	X X	X	X	X	X	X	X	X	X	X	X	X	X	X
**† <i>Onychogalea limata</i>	X X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Procoptodon goliath</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Procoptodon raphia</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Procoptodon</i> sp. indet.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Protomnodon anak</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Protomnodon brehus</i>	X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Protomnodon roechus</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Protomnodon</i> sp. indet.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Simosthenurus baileyi</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*† <i>Simosthenurus browniei</i>	X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X X X X X X	X	X	X	X	X	X
*† <i>Simosthenurus gilli</i>	X X X X X X	X X X X X X X X	X X X X X X X X	X X X X X X X X	X X X X X X X X	X X X X X X X X	X X X X X X X X	X X X X X X X X	X	X	X	X	X	X
*† <i>Simosthenurus middloeki</i>	X X X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X
*† <i>Simosthenurus newtonae</i>	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X
*† <i>Simosthenurus occidentalis</i>	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X
*† <i>Simosthenurus pales</i>	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X
*† <i>Simosthenurus</i> sp. indet.	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X
*† <i>Sthenurus andersoni</i>	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X
*† <i>Thylagale billardieri</i>	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X
<i>Thylagale</i> sp. indet.	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X X X X	X	X	X	X	X	X

TABLE 4. Summary of nomenclatural changes related to species included in this paper.

THIS PAPER	PREVIOUS NAME	REFERENCES FOR THE SOUTH EAST IN WHICH THE PREVIOUS NAME APPEARED
Myobatrachidae	Leptodactylidae	Tyler (1977, 1991); Williams (1980); Wells & Pledge (1983); Brown & Wells (2000); Moriarty <i>et al.</i> (2000).
<i>Criaria signifera</i>	<i>Ranidella signifera</i>	Tyler (1977); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Pledge (1990); Moriarty <i>et al.</i> (2000).
<i>Pogona barbata</i>	<i>Anphibolurus barbatus</i>	Smith (1976); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Pledge (1990); Moriarty <i>et al.</i> (2000).
<i>Eulamprus tympanum</i>	<i>Sphenomorphus tympanum</i>	Smith (1976); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Moriarty <i>et al.</i> (2000).
<i>Tiliqua rugosa</i>	<i>Trachydosaurus rugosus</i>	Smith (1976); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Cogger (2000).
<i>Coturnix xyptlophora</i>	<i>Coturnix australis</i>	Van Tets & Smith (1974); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Baird (1991); Baird <i>et al.</i> (1991).
<i>Gallirallus philippensis</i>	<i>Rallus philippensis</i>	Van Tets & Smith (1974); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Newton (1988 ²); Baird (1991); Baird <i>et al.</i> (1991).
<i>Burhinus grallarius</i> <i>Charadrius australis</i>	<i>Burhinus magnirostris</i> <i>Pelodytes australis</i>	Newton (1988 ²); Baird (1991). Van Tets & Smith (1974); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Baird (1991); Baird <i>et al.</i> (1991).
<i>Calyptorhynchus banksii</i>	<i>Calyptorhynchus magnificus</i>	Baird (1985); Newton (1988 ²); Baird (1991); Baird <i>et al.</i> (1991).
Dicruridae	Grallinidae	Van Tets & Smith (1974); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Baird (1991); Moriarty <i>et al.</i> (2000).
Artamidae	Cracticidae	Van Tets & Smith (1974); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Baird (1991); Moriarty <i>et al.</i> (2000).
<i>Megalibgwilia ramsayi</i>	<i>Zaglossus ramsayi</i>	Murray (1978); Pledge (1980c); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984); Pledge (1990); Griffiths <i>et al.</i> (1991).
<i>Thylacinus cynocephalus</i> <i>Vombatus</i> <i>Potorous tridactylus</i>	<i>Thylacinus major</i> <i>Phascodomys</i> <i>Potorous apicalis</i>	Williams (1980). Tindale (1933); Williams (1980). Smith (1971); Williams (1980); Wells & Pledge (1983); Wells <i>et al.</i> (1984).
<i>Pseudomys apodemoides</i>	<i>Pseudomys albocinctus</i>	Wells & Pledge (1983); Wells <i>et al.</i> (1984).

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

AMPHIBIANS

Hylidae: *Litoria ewingi*; Myobatrachidae: *Crinia signifera*, *Geocrinia laevis*, *Limnodynastes tasmaniensis*.

REPTILES

Chelidae: *Chelodina longicollis*, cf. **Emydura macquarii*; Agamidae: *Pogona* sp. indet. Scincidae: *Tiliqua nigrolutea*, *T. rugosa*; Varanidae: *Varanus* sp. cf. **V. gouldii*, *Varanus* sp. cf. **V. varius*; Madtsoiidae: **†Wombati naracoortensis*; Elapidae: *Pseudonaja* sp. indet.

BIRDS

Casuariidae: *Dromaius novaehollandiae*; Megapodiidae: **†Progura naracoortensis*; Phasianidae: *Columba* sp. indet.; Anatidae: undescribed taxon; Rallidae: **Gallinula mortierii*; Turnicidae: *Turnix varia*; Psittaciformes: family indet.; Passeriformes: family indet.; Corvidae: *Corvus* sp. indet.; Hirundinidae: *Hirundo neoxena*.

MAMMALS

Tachyglossidae: **†Megalibgwilia ramsayi*, *Tachyglossus aculeatus*; Thylacimidae: ***Thylacinus cynocephalus*; Dasyuridae: *Antechinus* sp. cf. *A. minimus*, **Dasyurus viverrinus*, **Phascogale* sp. indet., **†Sarcophilus laniarius*, **Sminthopsis leucopus*; Peramelidae: *Isoodon obesulus*, *Perameles* sp. cf. **P. bougainville*, *Perameles* sp. cf. **P. gunnii*; Phascolaridae: *Phascolaria* sp. cf. *P. cinereus*; Diprotodontidae: **†Diprotodon optatum*, **†Zygomaturus trilobus*; Palorchestidae: **†Palorchestes azael*; Vombatidae: *Lasiorchinus* sp. cf. **L. krefftii*, *Vombatus ursinus*; Thylacoleonidae: **†Thylacoleon carnifex*; Phalangeridae: *Trichosurus vulpecula*; Hypsiprymnodontidae: **†Propleopus oscillans*; Potoroidae: **Aepyprymnus rufescens*, *Bettongia* sp. cf. **B. gaimardi*, **Bettongia lesueur*, *Bettongia* sp. cf. **B. penicillata*, *Potorous* sp. cf. **P. platyops*, **P. tridactylus*; Macropodidae: ***Lagorchestes leporides*, **Lagostrophus fasciatus*, *Macropus* sp. cf. *M. giganteus*, ***M. greyi*, *M. rufogriseus*, **†M. titan*, ***Onychogalea lunata*, **†Procoptodon rapha*, **†Protemnodon roechus*, **†Simosthenurus browni*, **†S. gilli*, **†S. muddlocki*, **†S. newtonae*, **†S. occidentalis*, **†S. pales*, **†Sthenurus andersoni* (= **†Sthenurus atlasandersoni* of Pledge 1990, see Prideaux 1999), *Wallabia bicolor*; Burramyidae: *Cercarietus nanus*; Pseudocheiridae: *Pseudocheirus peregrinus*; Petauridae: *Petaurus brevipes*; Vespertilionidae: *Nyctophilus* sp. cf. *N. geoffroyi*,

Muridae: **Conturus* sp. indet., *Hydromys chrysogaster*, **Mastacomys fuscus*, *Pseudomys* sp. indet., *Rattus* sp. indet.

REFERENCES: Van Tets (1974); Tyler (1977, 1991); Pledge (1977, 1980c, 1990, 1991); Murray (1978); Williams (1980); Barrie (1990, 1997); Baird (1991b); Baird *et al.* (1991); Griffiths *et al.* (1991); McNamara (1997); Prideaux (1999, 2000); Scanlon & Lee (2000); South Australian Museum palaeontology collection records.

3. JAMES' QUARRY CAVE 5U29

LOCATION: Naracoorte township.

SITE DESCRIPTION: This small cave was uncovered by quarrying in 1956, discovered by A. James, proprietor of the quarry. It contained a partial skeleton of *Thylacoleon carnifex* (Daily, 1960). The cave has since been destroyed by quarrying.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Peramelidae: **Perameles bougainville*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: **†Thylacoleon carnifex*; Potoroidae: **Bettongia gaimardi*, **B. lesueur*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, ***Onychogalea lunata*, **†Simosthenurus gilli*.

REFERENCES: Daily (1960); Pledge (1977); Williams (1980); South Australian Museum palaeontology collection records.

Naracoorte Caves World Heritage Area

The Naracoorte Caves World Heritage Area has a total area of approximately 305 hectares and is centred 11 km southeast of the Naracoorte township. There are 26 caves on the reserve, many of which contain deposits of Pleistocene and/or Holocene vertebrates, with a particularly rich record of marsupials. The Naracoorte Caves were inscribed on to the World Heritage List in December 1994 as an Australian Fossil Mammal Site (serial nomination with Riversleigh, Queensland) for their exceptional natural and scientific value.

4. VICTORIA FOSSIL CAVE 5U1

LOCATION: Naracoorte Caves World Heritage Area.

DESCRIPTION: Large cave of approximately 4 km of mapped passages and chambers. The cave contains five known fossil deposits, with the largest and most studied being that in the Main Fossil Chamber, which was discovered in 1969 by members of CEGSA. Other chambers containing fossils have been found since then. All are currently under investigation by Flinders University palaeontologists and the faunas identified to date are listed below. Uranium-series dating of speleothems associated

¹ Probst, G. J. (1999) Systematics and evolution of the extinct kangaroo subfamily Sthenurinae. PhD Thesis, The Flinders University of South Australia (unpub).

with these fossil deposits has placed their age range from Middle to Late Pleistocene (Ayliffe *et al.* 1998; Moriarty *et al.* 2000).

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

4a. MAIN FOSSIL CHAMBER

SITE DESCRIPTION: This chamber has an extensive bone deposit within a large sediment cone and fan. The deposit has a complex depositional history with multiple modes of accumulation and concentration evident, chiefly pitfall trap, predator accumulation (avian and mammalian) and hydraulic transport. Uranium-series dating of flowstone on the surface of the deposit has provided a minimum age of about 213 ka (Ayliffe *et al.* 1998; Moriarty *et al.* 2000).

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

AMPHIBIANS

Hyllidae: *Litoria ewingi*; Myobatrachidae: *Crinia signifera*, *Geocrinia* sp. cf. *G. laevis*; *Limnodynastes* sp. cf. *L. dumerili*, *Limnodynastes tasmaniensis*.

REPTILES

Chelidae: *Emydura macquarii*; Agamidae: *Pogona* sp. cf. *P. barbata*; Scincidae: *Egernia whitii*, cf. *Eutamias tympanum*, *Lerista bougainvillii*, *Tiliqua nigrohutea*, *T. rugosa*; Varanidae: *Varanus* sp. cf. *V. gouldii*; *Varanus* sp. cf. *V. varius*; Madtsoiidae: *Womambii naracoortensis*; Elapidae: *Notechis* sp. cf. *N. scutatus*, *Pseudohis* sp. cf. *P. porphyraeus*, *Pseudonaja* sp. cf. *P. nuchalis*.

BIRDS

Casuariidae: *Dromaius novaehollandiae*; Megapodiidae: *Leipoa ocellata*, *Progura naracoortensis*; Phasianidae: *Columba pectoratus*, *C. ypsilophona*; Rallidae: *Gallinallus philippensis*; Turnicidae: *Turnix varia*; *Turnix* sp. indet.; Pedionomidae: *Pedionomus torquatus*; Scolopacidae: *Calidris ruficollis*, *Gallinago hutchinsii*, *Tringa glareola*; Charadriidae: *Charadrius australis*; Psittacidae: *Pezoporus wallacii*; Tytonidae: *Tyto novaehollandiae*; Diuridae: *Grallina cyanoleuca*; Artamidae: *Gymnorhina tibicen*; Corvidae: *Corvus* sp. indet. *Rallus gelliraius* listed by Moriarty *et al.* (2000) appears to be misspelling (W. Boles pers. comm. 2000).

MAMMALS

Tachyglossidae: *Megalibgwilia ramsayi*, *Tachyglossus aculeatus*; Thylacynidae: *Thylacynus vancephalus*; Dasyuridae: *Antechinus flavipes*, *A. stuartii*, *A. swainsonii*, *Dasyurus maculatus*, *D. viverrinus*, *Ningaui* sp. cf. *N. yvonnae*, *Phascogale calura*, *P. tapoutafa*, *Sarcophilus* sp.

cf. *S. lanianus*, *Smithopsis crassicaudata*, *S. murina*; Peramelidae: *Isodon obesulus*, *Perameles bougainville*, *P. gunnii*; Phascolaridae: *Phascolarctos cinereus*; Diprotodontidae: *Diprotodon* sp. indet., *Zygomaturus trilobus*; Palorchestidae: *Palorchestes azeai*; Vombatidae: *Lasiorchinus krefftii*, *L. latirostris*, *Vombatus ursinus*; Thylacoleonidae: *Thylacoleon carnifex*; Phalangeridae: *Trichosurus vulpecula*; Hypsiprymnodontidae: cf. *Propleopus oscillans*; Potoroidae: cf. *Aepyprymnus rufescens*, *Benongia gaimardi*, *Bellongia* sp. cf. *B. lesaeur*, *B. penicillata*, *Potorous platyops*, *P. tridactylus*; Macropodidae: *Lagorchestes leporides* (= *Lagorchestes* sp. cf. *L. conspicillatus* of Wells *et al.* 1984 and Moriarty *et al.* 2000, see McNamara 1997), *Macropus eugenii*, *M. fuliginosus*, *M. giganteus*, *M. greyi*, *M. rufogriseus*, *M. rian*, *Procoptodon goliath* (= *Procoptodon rapha* of Wells *et al.* 1984, see Prideaux 1999), *Protemnodon roechus*, *Simosthenurus baileyi*, *S. browni*, *S. gilli*, *S. muddlocki*, *S. newtonae*, *S. occidentalis*, *S. pales*, *Sihenerus andersoni* (= *Sihenerus atlas* of Wells *et al.* 1984, see Prideaux 1999), *Wallabia bicolor*; Burramyidae: *Cercartetus lepidus*, *C. nanus*; Pseudocheiridae: *Pseudocheirus peregrinus*; Petauridae: *Petaurus breviceps*; Acrobatidae: cf. *Acrobatius pygmaeus*; Vespertilionidae: *Miniopterus* sp. indet.; Muridae: *Comilurus albipes*, *Hydromys chrysogaster*; *Musuemys fuscus*, *Notomys* sp. cf. *N. mitchellii*, *P. apodemoides*, *P. australis*, *Pseudomys* sp. cf. *P. fuscus*, *Pseudomys* sp. cf. *P. gouldii*, *P. shortridgei*, *Rattus fuscipes*, *R. lunneyi*.

Moriarty *et al.* 2000 listed two additional marsupials, *Dasyurus crassicauda* and *Perameles nasuta*. However, no specimens can be located to support these identifications, which appear unlikely. They have therefore been omitted from this list.

4b. GRANT HALL (also known as White Chamber)

SITE DESCRIPTION: Excavations have yielded bone material from the sediment floor of the chamber, at the base of a large talus cone. The bone deposits are associated with several levels of speleothems, uranium-series dating of which indicates that the deposits accumulated between about 206 ka and 76 ka (Ayliffe *et al.* 1998; Moriarty *et al.* 2000). The site is currently under investigation by Rebecca Gresham from Flinders University.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

REPTILES

Agamidae: gen. et. sp. indet.; Varanidae: *Varanus* sp. indet.; Madtsoiidae: *Womambii naracoortensis*; Elapidae: gen. et. sp. indet.

BIRDS

Order indet.

MAMMALS

Tachyglossidae: *Tachyglossus aculeatus*; Thylacimidae: ***Thylacinus cynocephalus*; Phascolarctidae: *Phascolarctos cinereus*; Diprotodontidae: *†*Zygomaturus trilobus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: *†*Thylacoleon carnifex*; Potoroidae: **Bettongia penicillata*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *Macropus* sp. indet., *†*Simosthenurus browni*, *†*S. gilli*, *†*S. newtonae*, *Wallabia bicolor*; Burramyidae: *Cercartetus lepidus*, *C. nanus*; Muridae: **Musacomys fuscus*, *Pseudomys apodemoides*, **P. australis*, *Pseudomys* sp. cf. ***P. gouldii*, *P. shortridgei*, *Pseudomys* sp. indet., *Rattus fuscipes*, **R. namnyi*.

4c. SPRING CHAMBER (also known as Starburst Chamber)

SITE DESCRIPTION: Bone material has been excavated from the sediment floor of this large chamber. Although only preliminary work has been done on the site, uranium-series dating of associated speleothems suggests that deposition began before 327 ka and upper layers of the deposit accumulated between 280 ka and 210 ka (Moriarty *et al.* 2000). The site is currently under investigation by palaeontologists from Flinders University.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

MAMMALS

Dasyuridae: *Dasyurus* sp. cf. **D. viverrinus*; Phascolarctidae: *Phascolarctos cinereus*, *Phascolarctos* sp. cf. *†*P. stuarti*; Vombatidae: gen. et sp. indet.; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *Macropus* sp. indet., *†*Simosthenurus gilli*, *†*S. occidentalis*, *†*S. pales*; Muridae: *Hydromys chrysogaster*, **Rattus ummeyi*.

4d. UPPER AND LOWER OSSUARIES

SITE DESCRIPTION: These two chambers in the distal part of the cave contain immensely rich bone deposits. Discovered in the early 1970s by B. Wright and R. Galbreath (CEGSA), they remain largely untouched as a reference site. To date, surface material only has been examined, mostly *in situ*. No excavation has been done in these chambers. A few specimens were removed from the access tunnel for identification when the chambers were discovered. Additional material has been identified *in situ* by the authors.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

BIRDS

Casuariidae: cf. *Dromaius novaehollandiae*.

MAMMALS

Tachyglossidae: *†*Megalibgwila ramsayi*; Thylacimidae: ***Thylacinus cynocephalus*; Dasyuridae: *Sarcophilus* sp. cf. *†*S. lamarti*; Diprotodontidae: *†*Zygomaturus trilobus*; Thylacoleonidae: *†*Thylacoleon carnifex*; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *M. rufogriseus*, *†*Simosthenurus browni*, *†*S. gilli*, *†*S. maldocki*, *†*S. occidentalis*, *†*Simosthenurus andersoni*.

4e. BUTCH AND LAKE CHAMBER

SITE DESCRIPTION: A small chamber adjacent to the Main Fossil Chamber discovered in the early 1970s by A. Lake and B. Alvarez (CEGSA). Bone material was discovered and collected. Additional material was collected in 1997/1998 and identified by one of the authors (E. H. R.) and colleagues from Flinders University. All bone material within the chamber is found within the rock pile on the chamber floor, without any sedimentary context, thus providing some interesting preservational features (Moriarty *et al.* 2000).

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

REPTILES

Varanidae: *Varanus* sp. indet.

MAMMALS

Thylacimidae: *†*Thylacinus cynocephalus*; Phascolarctidae: *Phascolarctos cinereus*; Thylacoleonidae: *†*Thylacoleon carnifex*; Macropodidae: *Macropus* sp. cf. *M. fuliginosus*, *Macropus* sp. cf. *M. rufogriseus*, *Simosthenurus* sp. cf. *†*S. gilli*.

REFERENCES: Smith (1971, 1972, 1976); Van Tets & Smith (1974); Pledge (1977, 1980b, c, 1991); Tyler (1977, 1991); Wells (1978); Wells & Murray (1979); Williams (1980); Dawson (1982); Wells & Pledge (1983); Wells *et al.* (1984); Baird (1991a, b); Baird *et al.* (1991); Griffiths *et al.* (1991); McNamara (1997); Ayliffe *et al.* 1998; Prideaux & Wells (1998); Prideaux (1999^a, 2000); Turner (1999^b); Moriarty *et al.* (2000); M. Hutchinson (pers. comm. 1999, 2000); A. Baynes (pers. comm. 2000); R. Gresham (pers. comm. 2000); C. Williams (pers. comm. 2000); Flinders University vertebrate palaeontology collection database; South Australian Museum palaeontology collection records.

5. BAT CAVE SU2

LOCATION: Naracoorte Caves World Heritage Area.

SITE DESCRIPTION: Bone material was collected

* THURSON J. (1999) Investigation of the genus *Macropus* (Marsupialia: Macropodidae) from the Victoria Fossil Cave deposit Naracoorte, BSc (Hons) Thesis, The Flinders University of South Australia (unpub.).

from sediment beneath a ledge in the entrance chamber by Walsh in 1959. The deposit is estimated to be of Late Pleistocene age by faunal association, although it is likely that more recent material has been included with the collection.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Dasyuridae: **Dasyurus maculatus*, **Dasyurus* sp. indet., **Phascogale tapoutafa*, *Sarcophilus* sp. cf. **S. harrisi*; Phalangeridae: *Trichosurus vulpecula*; Potoroidae: **Bettongia gaimardi*; Macropodidae: **Simosthenurus browni*, *†*S. gilli*; Petauridae: *Petaurus breviceps*; Muridae: ***Comilurus albipes*, **Mastacomys fuscus*, *Rattus* sp. indet.

REFERENCES: South Australian Museum palaeontology collection records.

6. ALEXANDRA CAVE 5U3

LOCATION: Naracoorte Caves World Heritage Area.

SITE DESCRIPTION: Bone material was recovered from sediment when the second tourist entrance of the cave was dug out in 1978. Other fossil material was discovered during cave exploration excavations of small sediment filled tunnels in the current tourist section of the cave. Only preliminary investigation of this site has so far been attempted.

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Dasyuridae: **Dasyurus maculatus*, **D. viverrinus*, *Sarcophilus* sp. cf. **S. harrisi*; Phascolaretidae: *Phascolaretos cinereus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: **†*Thylacoleo carnifex*; Phalangeridae: *Trichosurus vulpecula*; Potoroidae: **Bettongia* sp. indet.; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *Macropus* sp. cf. *M. rufogriseus*, *Macropus* sp. indet., **†*Procoptodon gobi*, *†*Simosthenurus browni*, *†*S. gilli*, *†*S. occidentalis*, *Wallabia bicolor*

REFERENCES: Pledge (1977); Williams (1980). Flinders University vertebrate palaeontology collection database; South Australian Museum palaeontology collection records.

7. BLANCHE CAVE 5U4, 5U5, 5U6

LOCATION: Naracoorte Caves World Heritage Area.

SITE DESCRIPTION: Fossil material from this cave was described last century by Woods (1862), with additional material having been collected since then, mostly in the 1970s (notably the *Genyornis* specimen). A small number of bones has been collected from the third chamber of the cave by cave explorers.

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

BIRDS

Casuariidae: *Dromaius novaehollandiae*; Dromomithidae: *†*Genyornis newtoni*.

MAMMALS

Dasyuridae: **Dasyurus* sp. indet., **Sarcophilus* sp. indet.; Peramelidae: **Perameles bongainville*; Phascolaretidae: *Phascolaretos cinereus*; Thylacoleonidae: **†*Thylacoleo carnifex*; Phalangeridae: *Trichosurus vulpecula*; Potoroidae: **Bettongia gaimardi*; Macropodidae: *†*Lagorchestes leporides*, *Macropus* sp. cf. *M. giganteus*, *M. rufogriseus*, **†*Onychogalea lunata*, *†*Protomnodon brehus*, *†*Simosthenurus gilli*; Pseudochelidae: *Pseudochelirus peregrinus*.

REFERENCES: Woods (1862, 1866); Rich (1979); Wells & Pledge (1983); Baird (1991b); Baird *et al.* (1991); McNamara (1997); Flinders University vertebrate palaeontology collection database; South Australian Museum palaeontology collection records.

8. WET CAVE - Stick Entrance 5U10, Tomato Entrance 5U11 (also known as Tomato-Stick Cave)

LOCATION: Naracoorte Caves World Heritage Area.

SITE DESCRIPTION: Excavation was carried out in 1997/1998 in the distal fan sediments of a large sediment cone in the current tourist cave by Flinders University researchers. Abundant bone material was recovered, particularly small animals, with some megafaunal species at the lower levels of the sequence. The site is currently under investigation by M. McDowell (Flinders University). Preliminary results suggest a Late Pleistocene to Holocene age for the deposit. Other material has been collected from the cave in the past and lodged with the South Australian Museum.

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

AMPHIBIANS

Family indet.

REPTILES

Agamidae: gen. et sp. indet.; Scincidae: *Egernia whitii*, *Tiliqua nigrolutea*, *T. nigosa*; Varanidae: *Varanus* sp. cf. *V. varius*; Madtsoiidae: **†*Wonambi naracoortensis*; Elapidae: *Notechis scutatus*, *†*Pseudechis porphyriacus*, *Pseudonaja nuchalis*.

BIRDS

Psittacidae: gen. et sp. indet.; Tytonidae: *Tyto alba*; Artamidae: gen. et sp. indet.; Estrildidae: gen. et sp. indet.

MAMMALS

Thylacinidae: ***Thylacinus cynocephalus*; Dasyuridae: *Antechinus flavipes*, **Dasyurus geoffroi*, **D. viverrinus*, **Ningauia yvonnae*, **Phascogale tapoutafa*, **Sarcophilus harrisi*, *Smynthopsis crassicaudata*, *S. murina*; Peramelidae: **Perameles gunnii*; Phascolarctidae: *Phascolarctos cinereus*; Diprotodontidae: *†*Zygomaturus trilobus*; Thylacoleonidae: *†*Thylacoleo carnifex*; Phalangeridae: *Trichosurus vulpecula*; Potoroidae: **Bettongia lesueur*, ***Potorous platyops*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *Macropus* sp. indet., *†*Protemnodon brehus*, *†*Protemnodon* sp. indet., *†*Simosthenurus browni*, *†*S. gilli*, *†*S. newtonae*, *†*S. occidentalis*; Burramyidae: *Cercartetus concinnus*, *C. lepidus*, *C. nanus*; Pseudocheiridae: *Pseudocheirus peregrinus*; Petauridae: *Petaurus breviceps*; Vespertilionidae: *Miniopterus schreibersii*; Muridae: ***Conilurus albipes*, **Mustacomys fuscus*, *Notomys mitchellii*, *Pseudomys apodemoides*, **P. australis*, **P. jenkinsi*, *Pseudomys* sp. cf. ***P. gouldii*, *P. shorridgei*; *Rattus fuscipes*, *R. lutreolus*, **R. tumeyi*.

REFERENCES: Williams (1980); M. McDowell (pers. comm. 1999, 2000); Flinders University vertebrate palaeontology collection database; South Australian Museum palaeontology collection records.

9. CATHEDRAL CAVE 5U12, 5U13

LOCATION: Naracoorte Caves World Heritage Area. SITE DESCRIPTION: A large chamber in the distal part of the cave has a sediment cone deposit containing a large amount of bone material, some in association with dated flowstone. Uranium/thorium dating of these speleothems suggests that the material accumulated between approximately 279 ka and 159 ka (Brown 1998³; Brown & Wells 2000). Brown (Brown 1998³; Brown & Wells 2000) concluded that the primary accumulation mode was pitfall via a now-blocked solution tube. Other material including *Thylacoleo carnifex*, was collected from other small passages in the cave by CEGSA members in March 1959 and reported by Daily (1960).

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

AMPHIBIANS

Myobatrachidae: *Limnodynastes* sp. indet.

REPTILES

Scincidae: *Tiliqua rugosa*.

BIRDS

Family indet.

MAMMALS

Thylacinidae: ***Thylacinus cynocephalus*; Dasyuridae: *Antechinus flavipes*, *Antechinus* sp. indet., **Dasyurus maculatus*, **D. viverrinus*,

Phascogale calura*, *Smynthopsis murina*; Peramelidae: *Isodon obesulus*, **Perameles bougainville*, **P. gunnii*; Diprotodontidae: *†*Zygomaturus trilobus*; Vombatidae: gen. et sp. indet., **Lastorhinus latifrons*; Thylacoleonidae: *†*Thylacoleo carnifex*; Potoroidae: **Bettongia penicillata*, **Bettongia* sp. indet., *Potorous platyops*, **P. tridactylus*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *Macropus* sp. indet., *†*Procoptodon goliah*, *†*Simosthenurus browni*, *†*S. gilli*, *†*S. occidentalis*, *Wallabia bicolor*; Burramyidae: *Cercartetus nanus*; Muridae: **Mustacomys fuscus*, *Notomys mitchellii*, **Pseudomys australis*, *P. shorridgei*, *Pseudomys* sp. indet.

REFERENCES: Daily (1960); Pledge (1977); Williams (1980); Ayliffe *et al.* (1998); Brown (1998³; pers. comm. 2000); Brown & Wells (2000); Moriarty *et al.* (2000); Flinders University vertebrate palaeontology collection database; South Australian Museum palaeontology collection records.

10. ROBERTSON CAVE 5U17, 5U18, 5U19

LOCATION: Naracoorte Caves World Heritage Area. SITE DESCRIPTION: The inner chamber of the cave contains a rich bone deposit, particularly of small mammal remains. Megafaunal species have been found at the lower levels of the sequence suggesting a Pleistocene age. The sites is currently under investigation by M. McDowell (Flinders University). COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

AMPHIBIANS

Family indet.

REPTILES

Agamidae: gen. et sp. indet., Scincidae: *Egernia whitii*, *Tiliqua nigrolutea*, *T. rugosa*; Varanidae: *Varanus* sp. cf. **V. varius*; Elapidae: *Notechis scutatus*, **Pseudechis porphyriacus*, *Pseudonaja nuchalis*.

BIRDS

Family indet.

Psittacidae: gen. et sp. indet.; Tytonidae: *Tyto alba*; Artamidae: gen. et sp. indet.; Estrildidae: gen. et sp. indet.

MAMMALS

Dasyuridae: *Antechinus flavipes*, **Dasyurus geoffroi*, **D. viverrinus*, **Ningauia yvonnae*, **Phascogale tapoutafa*, *Smynthopsis crassicaudata*, *S. murina*; Peramelidae: *Isodon obesulus*, **Perameles gunnii*; Phascolarctidae: *Phascolarctos cinereus*; Vombatidae: *Vombatus ursinus*; Phalangeridae: *Trichosurus vulpecula*; Potoroidae: **Bettongia lesueur*, ***Potorous platyops*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *†*Protemnodon* sp. indet., *†*Simosthenurus occidentalis*; Burramyidae: *Cercartetus lepidus*, *C.*

unius; Pseudocheiridae: **Petauripides volans*, *Pseudocheirus peregrinus*; Petauridae: *Petaurus breviceps*; Vespertilionidae: *Minopterus schreibersii*; Muridae: ***Conilurus albigipes*, *Hydromys chrysogaster*, **Mastacomys fuscus*, *Notomys mitchelli*, *Pseudomys apodemoides*, **P. australis*, **P. fumeus*, *Pseudomys* sp. cf. ***E. gouldii*, *P. shortridgei*, *Rattus fuscipes*, *R. lutreolus*, **R. lunneyi*.

REFERENCES: M. McDowell (pers. comm. 1999, 2000); Flinders University vertebrate palaeontology collection database.

11. FOX CAVE 5U22

LOCATION: Naracoorte Caves World Heritage Area.
SITE DESCRIPTION: Fossil material has been recovered from this large cave, with excavations being conducted by researchers from the South Australian Museum and Flinders University. The deposit consists of numerous bones contained in the sediment floor of the cave and large sediment cone.

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

BIRDS

Megapodiidae: **†*Progura naracoortensis*; Alcedinidae: *Davelo* sp. cf. *D. novaeguineae*.

MAMMALS

Tachyglossidae: **†*Megalibgwilia ramsayi*, *Tachyglossus aculeatus*; Thylacimidae: **†*Thylacinus cynocephalus*; Dasyuridae: **Dasyurus maculatus*, **D. viverrinus*, *Sarcophilus* sp. cf. ††*S. lamiarlus*; Peramelidae: *Isoodon obesulus*, **Perameles gunnii*; Diprotodontidae: ††*Zygomaturus trilobus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: ††*Thylacoleo carnifex*; Phalangéridae: *Trichosurus vulpecula*; Potoroidae: †*Bettongia gaimardi*, †*Potorous tridactylus*; Macropodidae: *Macropus* sp. cf. *M. giganteus*, ***M. greyi*, *M. rufogriseus*, *Macropus* sp. cf. ††*M. titan*, ††*Procoptodon goliath*, ††*Simosthenurus browni*, ††*S. gilli*, ††*S. occidentalis*, *Wallabia bicolor*; Pseudocheiridae: *Pseudocheirus peregrinus*; Muridae: †*Mastacomys fuscus*, *Rattus* sp. cf. *R. lutreolus*.

REFERENCES: Pledge (1977, 1980c); Murray (1978); Baird (1991b); Baird *et al.* (1991); Flinders University vertebrate palaeontology collection database; South Australian Museum palaeontology collection records.

F2 UN-NAMED CAVE 5U49

LOCATION: Naracoorte Caves World Heritage Area.
SITE DESCRIPTION: A small cave with a solution pipe entrance and very little cave development. Bone material is contained within a sediment cone beneath a blocked former solution pipe entrance. No

excavations have been conducted in this cave but identifications were made from a small amount of material collected by the authors from areas that had been previously disturbed.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

REPTILES

Varanidae: *Varanus* sp. indet.

BIRDS

Megapodiidae: ††*Progura naracoortensis*.

MAMMALS

Thylacimidae: **†*Thylacinus cynocephalus*; Vombatidae: *Vombatus ursinus*; Macropodidae: *Macropus* sp. indet., ††*Simosthenurus gilli*.

REFERENCES: None.

13. WOMBAT CAVE 5U58

LOCATION: Naracoorte Caves World Heritage Area.

SITE DESCRIPTION: The second chamber of the cave was discovered in the early 1970s, with a small collection of bone material being lodged with the South Australian Museum. Additional material has been identified *in situ* on a rubble slope adjacent to a large area of speleothem development, much of which has formed over what was probably a cone beneath a solution pipe. The site is currently under investigation by one of the authors (EHR).

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

BIRDS

Megapodiidae: **†*Progura naracoortensis*.

MAMMALS

Dasyuridae: **Dasyurus viverrinus*; Peramelidae: **Perameles gunnii*; Vombatidae: *Vombatus ursinus*; Phalangéridae: *Trichosurus vulpecula*; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *M. rufogriseus*, **†*Protemnodon* sp. indet., ††*Simosthenurus browni*, ††*S. gilli*, ††*Sthenurus andersoni*.

REFERENCES: Baird (1991b); Baird *et al.* (1991); Flinders University vertebrate palaeontology collection database; South Australian Museum palaeontology collection records.

14. SAND FUNNEL CAVE 5U72

LOCATION: Naracoorte Caves World Heritage Area.
SITE DESCRIPTION: Bone material was collected from surface sediment in the 1970s, context unknown.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

MAMMALS

Macropodidae: †*Macropus eugonii*, †*Simosthenurus maddocki*.

REFERENCES: Flinders University vertebrate palaeontology collection database.

Other Naracoorte [district] cave sites

15. BROWN SNAKE CAVE 5U14

LOCATION: Naracoorte Forest, Forestry SA.

SITE DESCRIPTION: Bone material collected by CEGSA members, context unknown.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *†*Simosthenurus gilli*.

REFERENCES: Williams (1980); South Australian Museum palaeontology collection records.

16. HAYSTALL CAVE 5U23

LOCATION: Private land.

SITE DESCRIPTION: Bone material was excavated by W. Rouse and M. R. Wallis and N. Pledge and R. Callen, from within the cave during the 1960s, with abundant bone material discovered in the slope and fan of a large sediment cone.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils). Some identifications of material *in situ* were made by the authors.

FAUNA:

REPTILES

Scincidae: *Tiliqua nigrolutea*; Madtsoiidae: *†*Wombanbi naracoortensis*.

MAMMALS

Tachyglossidae: *Tachyglossus aculeatus*;

Thylaciniidae: ***Thylacinus cynocephalus*; Dasyuridae: *Antechinus* sp. indet., **Dasyurus viverrinus*,

*†*Sarcophilus lamiiarius*; Peramelidae: *Isoodon obesulus*, **Perameles gunnii*; Phascolarctidae:

Phascolarctos sp. indet.; Diprotodontidae: *†*Zygomaturus trilobus*; Vombatidae: *Vombatus ursinus*;

Thylacoleonidae: ***Thylacoleo carnifex*; Potoroidae:

Aepyprymnus rufescens*, **Bettongia gaimardi*, *Potorous platyops*, **P. tridactylus*; Macropodidae:

Macropus giganteus, *M. rufogriseus*, *Procoptodon* sp. cf. *†*P. goliath*, *†*Simosthenurus browni*, *†*S. gilli*, *†*S. maddocki*, *†*S. newtonae*, *†*S. occidentalis*,

Wallabia bicolor; Burramyidae: *Cercartetus nanus*;

Pseudocheiridae: *Pseudocheirus peregrinus*;

Muridae: **Mastacomys fuscus*, *Rattus lutreolus*.

REFERENCES: Merrilees (1965); Pledge (1977, pers. comm. 2000); Williams (1980); South Australian Museum palaeontology collection records.

17. UN-NAMED CAVE 5U28

LOCATION: North of Naracoorte township.

SITE DESCRIPTION: Small cave 60 m from VDC Cave (5U26). Bone material was collected during

cave exploration, context unknown.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *Macropus* sp. indet., *†*Simosthenurus browni*.

REFERENCES: South Australian Museum palaeontology collection records.

18. SPECIMEN CAVE 5U35 – (also known as Zietz Cave)

LOCATION: Private land.

SITE DESCRIPTION: A solution pipe leads down to a large chamber with bone deposits in sediment associated with flowstone layers. Stirling reported material of extinct marsupials, including *Thylacoleo carnifex*, from the cave in 1908 (Stirling 1908; Wells & Pledge 1983). Another report by Stirling in 1912 mentioned *T. carnifex* material from the Naracoorte Caves which had been presented to the South Australian Museum by W. Redden, the caretaker of the Caves. The name of the site from which this material was collected did not appear in the report. However, it is most likely to be Specimen Cave.

COLLECTION: Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

REPTILES

Scincidae: *Tiliqua rugosa*.

MAMMALS

Thylaciniidae: ***Thylacinus cynocephalus*;

Dasyuridae: **Dasyurus* sp. indet., *Sarcophilus* sp. cf. *†*S. lamiiarius*, *Sminthopsis* sp. indet.; Peramelidae:

**Perameles* sp. indet.; Vombatidae: *Vombatus ursinus*;

Thylacoleonidae: *†*Thylacoleo carnifex*;

Potoroidae: **Bettongia penicillata*, ***Potorous platyops*;

Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *Macropus* sp. cf. *†*M. titan*, *Macropus* sp. indet., *Protemnodon* sp. cf. *†*P. anak*, *†*P. roechus*,

*†*Simosthenurus baileyi*, *†*S. browni*, *†*S. gilli*, *†*S. maddocki*, *†*S. occidentalis*, **Thylagale* sp. indet.

REFERENCES: Stirling (1908, 1912); Pledge (1977); Williams (1980); Wells & Pledge (1983); Flinders University palaeontology collection database; South Australian Museum palaeontology collection records.

19. RABBIT CAVE 5U66

LOCATION: Private land.

SITE DESCRIPTION: This small cave has bones evident *in situ* on the surface of the sediment floor of a small distal chamber. No excavation has been conducted in the cave. However, identifications of material *in situ* were made by the authors.

COLLECTION: None made

FAUNA:

MAMMALS

Macropodidae: *Macropus* sp. cf. *M. fuliginosus*, *Simosthenurus* sp. cf. *†*S. browni*, *Simosthenurus* sp. cf. *†*S. gilli*.

REFERENCES: None.

20. POSSUM CAVE 5U81

LOCATION: Private land.

SITE DESCRIPTION: Plentiful bone material apparent within a large sediment cone and on the sediment surface, particularly the distal fan and beneath rock ledges. Thus far, only preliminary investigations have been made, with a very small amount of material collected for identification. The site is under further investigation by the authors.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

MAMMALS

Macropodidae: *Macropus* sp. cf. *M. fuliginosus*, *†*Protemnodon brehus*, *†*Simosthenurus browni*.

REFERENCES: Prideaux (1999⁵); Flinders University vertebrate palaeontology collection database.

21. CABLE CAVE 5U125

LOCATION: Private land.

SITE DESCRIPTION: The cave was discovered by workers laying cables in 1981, hence the name. A small solution pipe entrance leads to a steep talus cone, the distal portions of which contain abundant bone material within the sediment. Some preliminary collection and identifications have been made in disturbed areas.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

MAMMALS

Thylacainidae: ***Thylacinus cynocephalus*; Peramelidae: *Isodon obesulus*, **Perameles* sp. indet.; Vombatidae: *Vombatus ursinus*; Thylacoleomidae: *†*Thylacoleo carnifex*; Potoroidae: **Bettongia lesueur*, **Bettongia* sp. indet.; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *†*M. titan*, *Macropus* sp. indet., *†*Simosthenurus* sp. indet.

REFERENCES: Flinders University vertebrate palaeontology collection database.

22. SOS CAVE 5U132

LOCATION: Private land.

SITE DESCRIPTION: The entrance to this cave opened up naturally in 1983. Some bone material has been

collected by members of CEGSA and taken to the South Australian Museum for identification. This material included an almost complete skeleton of *Thylacinus cynocephalus* and the holotype of the extinct wallaby *Congruus congruus*.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Thylacainidae: ***Thylacinus cynocephalus*; Macropodidae: *†*Congruus congruus*, *†*Simosthenurus newtonae*.

REFERENCES: McNamara (1994); Sefton (1998⁷); Prideaux (1999⁵, 2000); South Australian Museum palaeontology collection records.

23. BUCKRIDGE CAVE 5U169

LOCATION: Private land.

SITE DESCRIPTION: Small cave uncovered during vineyard preparation in early 1999 and subsequently filled in within 72 hours of its discovery. The authors and colleagues were contacted by members of CEGSA to investigate the site which was found to contain significant fossil material. A salvage excavation was undertaken during the night to prevent the complete loss of the material and information. All obvious bone material and most sediment were removed from an approximately 4 m² area to a depth of approximately 50 cm. No other material was visible. Preliminary taphonomic analysis suggests that this small cave may have acted as a den for carnivores, notably Tasmanian Devils and *Thylacoleo carnifex*. Bone material from the site is currently under investigation by the authors.

COLLECTION: Currently held by the authors.

FAUNA:

REPTILES

Elapidae: *Notechis scutatus*.

BIRDS

Casuaridae: *Dromaius novaehollandiae*; Megapodiidae: cf. *†*Progora naracoortensis*.

MAMMALS

Taehyglossidae: *†*Megalibgwilia ramsayi*; Thylacainidae: ***Thylacinus cynocephalus*; Dasyuridae: **Dasyurus maculatus*, **D. viverrinus*, *Sarcophilus* sp. cf. *†*S. lunifurcus*; Peramelidae: *Isodon obesulus*, *Perameles* sp. cf. **P. gunnii*; Palorchestidae: *†*Palorchestes azeai*; Vombatidae: **Lasiorchinus* sp. indet.; Thylacoleonidae: *†*Thylacoleo carnifex*; Potoroidae: **Bettongia gaimardi*, **B. lesueur*, **B. penicillata*; Macropodidae: *Macropus* sp. cf. *M. fuliginosus*, *Macropus* sp. cf. *M. giganteus*, *†*M. greyi*, *M. rufogriseus*, *†*M. titan*, *Macropus* sp. indet., *Protemnodon* sp. cf. *†*P. anak*, *†*Simosthenurus* sp. indet., *†*Sthenurus andersoni*, **Thylagade billardieri*, *Wallabia bicolor*; Muridae:

⁷ SEFTON, M. (1998) SOS Cave (5U132). *Cave Exploration Group of South Australia News*, 43: 48-53.

Notomys mitchelli, **Pseudomys australis*, ***P. gouldii*, *P. shortridgei*, *Pseudomys* sp. indet.

REFERENCES: None

24. CRAWFORD'S CORNUCOPIA CAVE 5U171

LOCATION: Private land.

SITE DESCRIPTION: Small cave recently uncovered during vineyard preparation in mid-1999; subsequently opened up by machinery. A small sediment cone contains very fragile bone material with a lower, cemented layer with numerous cranial and post-cranial elements, some in articulated and associated states. Investigation of the site by the authors has begun.

COLLECTION: Currently held by the authors.

FAUNA:

REPTILES:

Chelidae: gen. et sp. indet., Elapidae: gen. et sp. indet.

BIRDS:

Casuariidae: *Dromaius novaehollandiae*; Megapodiidae: *Progura* sp. cf. *†*P. naracoortensis*.

MAMMALS:

Thylacainidae: ***Thylacinus cynocephalus*; Dasyuridae: *Sarcophilus* sp. cf. *†*S. lanarius*; Peramelidae: *Isoodon obesulus*, **Perameles* sp. indet.; Phascolarctidae: *Phascolarctos cinereus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: *†*Thylacoleo carnifex*; Potoroidae: **Bettongia lesueur*; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *M. rufogriseus*, *†*Protemnodon brehus*, *†*Simosthenurus baileyi*, *†*S. browni*, *†*S. gilli*, *†*S. maddocki*, *†*S. occidentalis*, *Wallabia bicolor*.

Muridae: gen. et sp. indet.

REFERENCES: G. Prideaux (pers. comm. 1999).

25. CHILISE AND PUTTY CAVE 5U76

LOCATION: Private land.

SITE DESCRIPTION: Material collected from the cave in 1967 by G. Langeluddecke, and lodged with the South Australian Museum; context unknown.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS:

Macropodidae: *Macropus* sp. indet.; *†*Simosthenurus* sp. indet.

REFERENCES: South Australian Museum palaeontology collection records.

26. COMAUM FOREST CAVE 5U118 (also known as Comaum Quarry Cave)

LOCATION: Comaum Forest, Forestry SA.

SITE DESCRIPTION: Bone material excavated from the cave by the South Australian Museum in the early 1980s.

COLLECTION: South Australian Museum

palaeontology collection (vertebrate fossils).

FAUNA:

REPTILES:

Chelidae: gen. et sp. indet.; Scincidae: *Tiliqua rugosa*.

BIRDS:

Family indet.

MAMMALS:

Tachyglossidae: *†*Megalibgwilia ramsayi*, *Tachyglossus aculeatus*; Thylacainidae: ***Thylacinus cynocephalus*; Dasyuridae: *Antechinus* sp. indet., **Dasyurus maculatus*, **D. viverrinus*, *†*Sarcophilus lanarius*; Peramelidae: **Perameles gunnii*; Phascolarctidae: *Phascolarctos cinereus*; Vombatidae: *Vombatus ursinus*, *†*Warembia wakefieldi*; Thylacoleonidae: *†*Thylacoleo carnifex*; Potoroidae: **Bettongia gaimardi*, **Potorous tridactylus*; Macropodidae: *Macropus giganteus*, ***M. greyi*, *M. rufogriseus*, *†*Protemnodon* sp. indet., *†*Simosthenurus browni*, *†*S. gilli*, *†*S. maddocki*, *†*S. newtoni*, *†*S. occidentalis*, *†*S. pates*, *†*Sthenurus andersoni*, **Thylogale billardieri*, *Wallabia bicolor*; Burramyidae: *Cercartetus nanus*; Pseudocheiridae: *Pseudocheirus peregrinus*; Muridae: gen. et sp. indet.

REFERENCES: Flannery & Pledge (1987); South Australian Museum palaeontology collection records.

Sites and Faunas of the Lower South East region

Penola district

27. PENOLA

LOCATION: 22 km NNW of Penola.

SITE DESCRIPTION: Bones were discovered during the sinking of a well on the edge of a swamp in the mid-nineteenth century.

COLLECTION: Whereabouts of material unknown.

FAUNA:

BIRDS:

Dromornithidae: *†*Gonyornis* sp. indet.

REFERENCES: Woods (1866); Stirling & Zietz (1896, 1900); Rich (1979); Williams (1980); Wells & Pledge (1983); Baird *et al.* (1991).

28. MONBULLA CAVE 5L5

LOCATION: Monbulla area, west of Penola.

SITE DESCRIPTION: Bone material was collected in 1978 and 1992 by cavers, from a low passage in the entrance chamber of the cave on the surface of the cave floor. The presence of *Simosthenurus browni* material from the cave indicates some Pleistocene material.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

REPTILES

Scincidae: *Tiliqua rugosa*.

MAMMALS

Vombatidae: *Vombatus ursinus*; Macropodidae:

*†*Simosthenurus browni*; Felidae: *Felis catus*;

Bovidae: *Ovis aries*; Muridae: *†*Conilurus albipes*.

REFERENCES: South Australian Museum palaeontology collection records.

29. UN-NAMED CAVE 5L122

LOCATION: Near Penola.

SITE DESCRIPTION: Bone material was collected by F. W. Aslin, and presented to the South Australian Museum in October 1970.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *Simosthenurus* sp. cf. *†*S. gilli*.

REFERENCES: J. McNamara (pers. comm. 1999); South Australian Museum palaeontology collection records.

Millicent district

30. MT BURR CAVE 5L69, 5L70

LOCATION: Mt Burr Forest, Forestry SA.

SITE DESCRIPTION: Bone material collected by cavers during exploration; context unknown.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *†*Simosthenurus gilli*, *†*S. occidentalis*.

REFERENCES: Williams (1980); South Australian Museum palaeontology collection records.

31. UN-NAMED SITE NEAR MILLICENT

LOCATION: Unknown.

SITE DESCRIPTION: Fossils found in a peat matrix at a depth of approximately 2 m, suggesting an ancient swamp accumulation. The find was reported in Waterhouse (1882).

COLLECTION: Whereabouts of material unknown.

FAUNA:

MAMMALS

Diprotodontidae: *†*Diprotodon* sp. indet., *†*Zygomaturus trilobus*.

REFERENCES: Waterhouse (1882); Williams (1980).

32. UN-NAMED SITE

LOCATION: Private land, Millicent area.

SITE DESCRIPTION: Following excavation of a new dam in March 2000 the landowner collected bones from a pile of sediment discarded during bulldozing.

The landowner brought the bone material to the attention of the authors who identified some of the elements as belonging to megafaunal species and others to macropodids, sheep and pigs. In order to determine the stratigraphic position of the megafaunal elements, and the extent of the deposit, the authors partially drained the dam, which had been filled, and searched for more bone material. Bones of diprotodontids, shenurine kangaroos and other macropodids were collected from a thick, black organic mud matrix at a depth of approximately 1.5 m below the land surface. No introduced species were found at this level, therefore their presence in the material collected by the landowner from the discarded sediment suggests mixing of material during excavation and dumping of sediment. The site represents a swamp accumulation and is currently under further investigation by R. Wells, the authors, and colleagues from Flinders University.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

MAMMALS

Tachyglossidae: *Tachyglossus aculeatus*; Dipro-

dontidae: *†*Diprotodon australis*, *†*Zygomaturus*

trilobus; Macropodidae: *†*Macropus greyi*,

Macropus sp. indet., *Simenurus* sp. cf. *†*S.*

andersoni; Suidae: *Sus scrofa*; Bovidae: *Ovis aries*.

REFERENCES: R. Wells (pers. comm. 2000).

Mount Gambier district

33. GLENCOE

LOCATION: 22 km NW of Mt Gambier.

SITE DESCRIPTION: The preservation of the fossils (i.e. white bone with red sediment adhering), is suggestive of a cave deposit, possibly Glencoe West Cave (5L77) or Glencoe East Cave (5L108). Further information is unavailable.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Diprotodontidae: gen. et sp. indet.; Macropodidae:

Macropus sp. indet., *†*Simosthenurus gilli*, *†*S.*

occidentalis.

REFERENCES: Tindale (1933); Williams (1980); South Australian Museum palaeontology collection records.

34. TANTANOOLA CAVE 5L12

LOCATION: Near Tantanoola.

SITE DESCRIPTION: Bone material has been collected from a sediment-floored tunnel and in breccia in the current tourist cave. Beach sediments and sea-shells partially filled the cave (N. Pledge pers. comm. 2000).

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Dasyuridae: **Dasyurus* sp. indet., **Sarcophilus* sp. indet.; Peramelidae: *Isodon* sp. indet.; Diprotodontidae: *†*Zygomaturus trilobus*; Vombatidae: *Vombatus ursinus*; Phalangeridae: *Trichosurus vulpecula*; Macropodidae: *†*Protemnodon roechus*, *†*Simosthenurus gilli*, *†*S. occidentalis*; Otilidae: *Arctocephalus* sp. indet.; Muridae: *Hydromys* sp. indet., *Rattus* sp. indet.

REFERENCES: Tindale (1933); Williams (1980); South Australian Museum palaeontology collection records.

35. TINDALE'S CAVE "E" 5L18

LOCATION: Tantanoola.

SITE DESCRIPTION: Bone material was collected by cavers and presented to the South Australian Museum.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *†*Simosthenurus gilli*.

REFERENCES: Tindale (1933); J. McNamara (pers. comm. 1999); South Australian Museum palaeontology collection records.

36. MORGANS CAVE 5L34

LOCATION: Tantanoola.

SITE DESCRIPTION: Material was collected in 1958 by B. Daily; context unknown.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *Macropus rufogriseus*, *†*Simosthenurus gilli*.

REFERENCES: South Australian Museum palaeontology collection records.

37. GREEN WATERHOLE CAVE 5L81 (also known as Fossil Cave)

LOCATION: 22 km NW of Mt Gambier.

SITE DESCRIPTION: A water-filled cave, with fossils discovered by divers on the surface of a rockpile, at a depth of 15 m. Collections were made by divers during the mid to late 1960s and 1970s and taken to the South Australian Museum and Australian Museum. Extensive collecting trips were organised by R. T. Wells in 1979. It has been suggested that the probable accumulation mode was drowning of animals that fell into the cave, trying to use it as a drinking water source (Pledge 1980a; Newton 1988²).

COLLECTION: Australian Museum palaeontology collection; Flinders University vertebrate palaeontology collection; South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

BIRDS

Phasianidae: *Coturnix* sp. indet.; Accipitridae: Undescribed taxon; Falconidae: *Falco* sp. cf. *F. berigora*; Rallidae: *†*Gallinula mortierii*; Gallinidae sp. cf. *G. tenebrosa*; Turnicidae: *Turnix varia*; Burhinidae: *Burhinus* sp. cf. *B. grallarius*; Columbidae: *Phaps chalcoptera*, *Phaps* sp. indet.; Cacatuidae: *Cacatua tenuirostris*, *Callacephalon finbriatum*, *†*Calyptorhynchus banksii*, *C. lathamii*, *Calyptorhynchus* sp. indet.; Psittacidae: *Platycercus* sp. indet.; Cuculidae: *†*Centropus colossus*; Strigidae: *Ninox novaeseelandiae*; Alcedinidae: *Dacelo novaeguineae*; Acanthizidae: *Dasyornis broadbenti*; Meliphagidae: *Manorina melanoccephala*; Orthonychidae: *†*Orthonyx hyspilophus*; Corvidae: *Corvus* sp. indet.; Hirundinidae: gen. et sp. indet.

MAMMALS

Thylacinae: *†*Thylacinus cynocephalus*; Dasyuridae: *†*Dasyurus maculatus*, *†*Sarcophilus* sp. indet.; Peramelidae: *Isodon obesulus*; Phascolaridae: *Phascolarctos cinereus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: *†*Thylacoleo carnifex*; Phalangeridae: *Trichosurus vulpecula*; Hypsiprymnodontidae: *†*Propleopus oscillans*; Potoroidae: *†*Bettongia penicillata*, *Potorous* sp. cf. *†*P. tridactylus*; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *†*M. greyi*, *M. rufogriseus*, *†*M. titan*, *Macropus* sp. indet., *Protemnodon* sp. cf. *†*P. anak*, *†*Protemnodon* sp. indet., *†*Simosthenurus gilli*, *†*S. maddocki*, *†*S. newtonae*, *†*S. occidentalis*, *Wallabia bicolor*; Chiroptera: family indet.; Suidae: *Sus scrofa*; Bovidae: *Ovis aries*; Muridae: gen. et sp. indet.

Newton (1988²) listed *Macropus rufus* for the deposit. However, no specimen can be located by the authors to support this identification, which appears unlikely. This species has therefore been omitted from the list. Newton (1988²) also listed *†*Sthenurus stirlingi*, which was later found to be a misidentification (G. Prideaux pers. comm. 2000).

REFERENCES: Wells & Murray (1979); Pledge (1980a); Williams (1980); Baird (1985); Newton (1988²); Baird (1991a, b); Baird *et al.* (1991); Prideaux (1999², 2000); Flinders University palaeontology collection database; South Australian Museum palaeontology collection records.

38. WANDILO FOREST CAVE 5L365

LOCATION: Mount Gambier Forest, Forestry SA.

SITE DESCRIPTION: This small cave was discovered in 1997 by members of CEGSA. Numerous bones

were obvious on the surface of the floor sediment, and within the sediment cone. A small number of bones was collected by CEGSA and taken to the South Australian Museum for identification. The authors and M. C. McDowell visited the site with CEGSA in August 1998, when further identifications of some fossil material were made *in situ*.

Collection: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Phascolarctidae: *Phascolarctos cinereus*; Diprotodontidae: cf. \dagger *Zygomaturus trilobus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: \dagger *Thylacoleo carnifex*; Potoroidae: \dagger *Potorous tridactylus*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, \dagger *Procoptodon* sp. indet., \dagger *Simosthenurus browni*.

REFERENCES: Reed (1998³): South Australian Museum palaeontology collection records.

39. WANDILO CAVE 5L74

LOCATION: Mount Gambier Forest, Forestry SA.

SITE DESCRIPTION: Bone material was collected by cavers during exploration in 1992 and taken to the South Australian Museum.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Vombatidae: *Vombatus ursinus*; Phalangeridae: *Trichosurus vulpecula*; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *Macropus* sp. cf. *M. rufogriseus*, \dagger *Simosthenurus maddocki*, \dagger *S. occidentalis*.

South Australian Museum palaeontology collection records.

40. MOORAK

LOCATION: 5 km south of Mount Gambier.

SITE DESCRIPTION: Probable cave deposit, context unknown.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Thylacoleonidae: \dagger *Thylacoleo carnifex*; Macropodidae: *Macropus giganteus*, *Macropus* sp. indet., \dagger *Simosthenurus pales*.

REFERENCES: Pledge (1977); Williams (1980); South Australian Museum palaeontology collection records.

41. KILSBY'S HOLE 5L46

LOCATION: 5 km south west of Mount Gambier.

³ REED, E. H. (1998) A "pressing" engagement with some sortously good fossils at 5L362, Wandilo Cave Exploration Group of South Australia News, 43, 105-104.

SITE DESCRIPTION: Bone material was found in the fill from a small solution tube exposed by excavation in 1988, of a ramp to the water level in the sinkhole.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Tachyglossidae: *Megalibgwilia* sp. cf. \dagger *M. ramsayi*; Thylacynidae: \dagger *Thylacynus cynocephalus*; Dasyuridae: \dagger *Dasyurus maculatus*, \dagger *Sarcophilus* sp. indet.; Peramelidae: *Isodon obesulus*, \dagger *Perameles bougainville*, \dagger *P. gunii*; Phascolarctidae: *Phascolarctos cinereus*; Diprotodontidae: \dagger *Zygomaturus trilobus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: \dagger *Thylacoleo carnifex*; Phalangeridae: *Trichosurus vulpecula*; Potoroidae: \dagger *Bettongia lesueur*, \dagger *Potorous tridactylus*; Macropodidae: \dagger *Lagorchestes leporides*, *Macropus* sp. indet., \dagger *Protemnodon* sp. indet., \dagger *Simosthenurus gilli*, \dagger *S. newtonae*, \dagger *S. occidentalis*, \dagger *S. pales*, \dagger *S. sthenurus andersoni*; Burramyidae: *Cercartetus* sp. cf. *C. nanus*; Pseudocheiridae: *Pseudocheirus peregrinus*; Chiroptera: family indet.; Canidae: *Canis lupus familiaris*; Bovidae: *Ovis aries*; Muridae: \dagger *Conilurus albipes*, \dagger *Mastacomys fuscus*, *Rattus* sp. indet.; Leporidae: *Oryctolagus cuniculus*.

REFERENCES: McNamara (1997); South Australian Museum palaeontology collection records.

42. SIMPSON'S HOLE 5L42 (also known as Ten-eighly Sinkhole)

LOCATION: Near Mount Gambier.

SITE DESCRIPTION: Bones discovered by divers in the flooded section of the cave.

COLLECTION: Flinders University vertebrate palaeontology collection.

FAUNA:

MAMMALS

Diprotodontidae: \dagger *Diprotodon* sp. indet.; Macropodidae: *Macropus* sp. indet., \dagger *Protemnodon noechus*.

REFERENCES: Flinders University palaeontology collection database.

43. GOULDENS HOLE 5L8 (also known as Gouldens Hole Cave)

LOCATION: Several kilometres west of Mt Schank.

SITE DESCRIPTION: A small tunnel on SSE side of the cenote (Gouldens Hole), was uncovered by a farmer digging an access ramp to the water. The tunnel floor was covered with silt containing fossil material and bones of modern vertebrates. The site was excavated by researchers from the South Australian Museum in 1982. Pledge (1991) suggests that the bones were probably derived from a filled entrance further up-slope in the tunnel, and reached the lower extremity of the tunnel by water-

winning. He describes it as a "reworked, mixed assemblage" (Pledge 1991).

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

REPTILES

Family indet.

BIRDS

Phalacrocoracidae: *Phalacrocorax melanoleucus*; Accipitridae: *Aquila audax*.

MAMMALS

Tachyglossidae: *Megalibgwilia* sp. cf. *†*M. ramsayi*; *Tachyglossus aculeatus*; Thylacynidae: ***Thylacynus cynocephalus*; Dasyuridae: **Dasyurus maculatus*, **Dasyurus* sp. indet., **Sarcophilus* sp. indet.; Peramelidae: *Isodon* sp. cf. *I. obesulus*, *Perameles* sp. cf. **P. gunni*; Phascolaridae: *Phascolarctos cinereus*; Palorchestidae: *Palorchestes* sp. cf. *†*P. parvus*; Vombatidae: *Vombatus ursinus*; Thylacoleonidae: *†*Thylacoleo carnifex*; Phalangeridae: *Trichosurus vulpecula*; Potoroidae: **Bettongia gaimardi*, **Potorous tridactylus*; Macropodidae: *Macropus giganteus*, *M. rufogriseus*, *†*M. titan*, *Macropus* sp. indet., *†*Protemnodon brehus*, *†*P. roechus*, *†*Simosthenurus gilli*, *†*S. maddocki*, *†*S. newtonae*, *†*S. occidentalis*, *†*Sthenurus andersoni*, *Wallabia bicolor*; Pseudocheiridae: *Pseudocheirus peregrinus*; Canidae: *Canis lupus familiaris*, *Vulpes vulpes*; Felidae: *Felis catus*; Bovidae: *Ovis aries*; Muridae: **Mastacomys fuscus*, gen. et sp. indet. REFERENCES: Pledge (1991); Baird (1991b); Baird *et al.* (1991); South Australian Museum palaeontology collection records.

44. TANKSTAND CAVE 5L65

LOCATION: 3 km west of Mt Schank.

SITE DESCRIPTION: Bone material was collected from the drowned part of cave, situation unknown.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *†*Simosthenurus gilli*.

REFERENCES: Williams (1980); South Australian Museum palaeontology collection records.

Mount Gambier Township

45. UN-NAMED CAVE

LOCATION: Derrington Street, Mount Gambier (town).

SITE DESCRIPTION: Cave exposed by earthworks for a sewer trench in 1963.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Peramelidae: **Perameles* sp. indet.; Phascolaridae:

Phascolarctos sp. indet.; Diprotodontidae: *†*Zygomaturus trilobus* (= *Nototherium* of Williams 1980); Thylacoleonidae: *†*Thylacoleo carnifex*; Potoroidae: **Bettongia* sp. indet.; Macropodidae: *†*Simosthenurus browni*, *†*S. gilli*, *†*S. maddocki*, *†*Sthenurus andersoni*; Pseudocheiridae: *Pseudocheirus peregrinus*.

REFERENCES: Pledge (1977); Williams (1980); South Australian Museum palaeontology collection records.

46. UN-NAMED CAVE

LOCATION: Mount Gambier (town); other details unknown.

SITE DESCRIPTION: Unknown.

COLLECTION: Natural History Museum (London).

FAUNA:

BIRDS

Dromornithidae: *†*Genyornis* sp. indet.

REFERENCES: Stirling and Zietz (1896, 1900); Rich (1979); Williams (1980); Baird *et al.* (1991).

47. UN-NAMED CAVE

LOCATION: Grey Street, Mount Gambier (town).

SITE DESCRIPTION: Cave exposed by excavation.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: *†*Simosthenurus browni*, *†*S. gilli*. REFERENCES: Williams (1980); South Australian Museum palaeontology collection records.

48. ENGELBRECHT CAVE 5L19

LOCATION: Jubilee Highway, Mount Gambier (town).

SITE DESCRIPTION: Bones have been recovered by divers in the flooded section of the current tourist cave. The bone material was identified by palaeontologists from Flinders University.

COLLECTION: Engelbrecht Cave management.

FAUNA:

MAMMALS

Vombatidae: *Vombatus ursinus*; Macropodidae: *Macropus* sp. cf. *M. giganteus*, *Protemnodon* sp. cf. *†*P. brehus*.

REFERENCES: None.

49. THE BLUE LAKE

LOCATION: Mount Gambier.

SITE DESCRIPTION: Bone material has been found in a solution cavity during excavation of an access tunnel at a depth of between 41 m and 42 m from the lower pump station entrance.

COLLECTION: South Australian Museum palaeontology collection (vertebrate fossils).

FAUNA:

MAMMALS

Macropodidae: †*Simosthenurus* sp. indet.

REFERENCES: South Australian Museum palaeontology collection records.

Discussion

As the data presented above clearly demonstrate, the South East of South Australia holds a significant record of Pleistocene sites and vertebrate fossil faunas. The numerous cave systems and other sites in the region have accumulated vertebrate remains over an extended period of time and with increased palaeontological research in the region more sites are being discovered. Recent improvements in geochronological techniques have enabled researchers to concentrate on developing chronologies for several of the sites in the region, particularly those within the Naracoorte Caves World Heritage Area (Ayliffe & Veeh 1988; Ayliffe *et al.* 1998; Moriarty *et al.* 2000). Current taphonomic research being carried out on various deposits within the World Heritage Area and its surrounds is allowing us to piece together the accumulation history of many of these deposits and to determine their representativeness and suitability for use in palaeoecological reconstructions. Only with a thorough knowledge of the faunas, taphonomy, geology and chronologies of these sites can valid palaeoecological analyses be made.

The distributions of taxa between the sites are summarised in Table 3. The data reveal some interesting patterns in the faunas represented and the level of scientific attention that they have received. There has been very little research done on the amphibian fossils from the region since Tyler (1977, 1991) worked on material from cave sites at Naracoorte. There is now more material available and a review of this group could reveal more species. As all of the species listed by Tyler (1977, 1991) are still living in the region today, the frog assemblages could be very useful in palaeoecological reconstructions. The fossil reptile faunas have also received little attention since the 1970s, with the exception of the work of Barrie (1991), Williams (1999^a) and Scanlon & Lee (2000). The varanids, agamids and elapids all require further research.

The fossil bird faunas of the region have received some attention (Van Tets 1974; Van Tets & Smith 1974; Rich 1979; Baird 1985, 1991a, b; Baird *et al.* 1991; M. McDowell pers. comm. 2000) but further investigation of material recovered in recent years, particularly from the Naracoorte Caves World

Heritage Area, is required as it may reveal more species. Baird (1985, 1991a) did extensive work on avian taphonomy and described different modes of accumulation for bird remains. A comparison between sites, particularly the Main Fossil Chamber in the Victoria Fossil Cave (site 4) and Green Waterhole Cave (site 37) which have the largest fossil bird assemblages from the region, reveals quite different species compositions, probably related to different accumulation modes. Further research on the bird faunas may reveal some other interesting taphonomic biases.

Some research has been carried out on the fossil small mammal faunas of the region (Smith 1971, 1972; M. McDowell pers. comm. 1999, 2000; A. Baynes pers. comm. 2000). Recent work in Wet Cave (site 8) and Robertson Cave (site 10) (M. McDowell pers. comm. 2000) reveals assemblages composed primarily of small mammals (see Table 3), perhaps derived mainly from owl pellets rather than a pitfall trap, which has been suggested as the main mode of accumulation in many other cave sites.

Re-investigation of some of the fossil small mammal material may be required to confirm some identifications. One example is the fossil *Antechinus* material. Four species of *Antechinus* have been identified in Pleistocene faunas from the South East (Table 3); of these species, *A. flavipes* and *A. minimus* are still living in the region (Strahan 1995; Robinson *et al.* 2000). Two species, **A. stuartii* (see Systematics section) and **A. swainsonii*, are not found in the South East today (Strahan 1995, Robinson *et al.* 2000), and are only listed for one Pleistocene site (site 4a) in the region, as is *A. minimus* (site 2). These four species may have been part of a more diverse fauna during the Pleistocene or alternatively, one or more of these may represent misidentification. The fossil *Antechinus* material from the South East needs further work to resolve such issues. Another group that has been very little studied is the fossil bats. There are currently around 11 species living in the region (Robinson *et al.* 2000), of which at least five are known to inhabit caves, yet only two species (*Miniopterus schreibersii* and *Nyctophilus geoffroyi*) have so far been identified from fossil deposits (see Table 3). As owls are still active predators of bats in the region and have been accumulators of small mammal remains in the past, a more intensive study of the plentiful fossil small mammal material (particularly from the Naracoorte Caves World Heritage Area) should reveal more bat species.

The fossil large mammals (>5 kg live weight) have received more attention than other groups in the region (Daily 1960; Merrilees 1965; Pledge 1977, 1980a, c, 1990, 1991; Murray 1978; Wells & Murray 1979; Wells *et al.* 1984; Flannery & Pledge 1987,

^a WILLIAMS, C. (1999) Fossil lizard identification methods: A case study of three *Lacerta* species. BSc (Hons) Thesis, The University of Adelaide (unpubl.).

Griffiths *et al.* 1991; McNamara 1994; Brown 1998; Prideaux & Wells 1998; Prideaux 1999⁵, 2000; Turner 1999⁶). The sites of the South East contain a rich record of the extinct megafauna, particularly the sthenurine kangaroos (Merrilees 1965; Wells & Murray 1979; Pledge 1980a; Prideaux & Wells 1998; Prideaux 1999⁵, 2000). The macropodids are the dominant group with 26 species represented; of these 16 became extinct during the Pleistocene, three totally extinct following European settlement and three locally extinct (Table 3). Currently there are only four species found in the region (Robinson *et al.* 2000). The large diprotodontids are sparsely represented in the deposits with ³*Zygomaturus trilobus* the most commonly found (recorded in 15 sites). Palorchestids are particularly rare. These may represent real abundances in the ancient faunas or taphonomic biases related to the modes of accumulation. Of the large mammalian carnivores, ²*Thylacoleo carnifex* is well represented in the region (recorded from 23 sites), ⁴*Thylacinus cynocephalus* moderately well represented (19 sites) and the devils (*Sarcophilus* spp.) represented in 17 sites (Table 3).

Material representing species for which there is only a single record from the region may require careful re-investigation to ensure that the identifications are correct (see the note regarding ⁴*Dasyurus cristivauda* and ⁵*Perameles nasuta* for site 4(i)). However, single specimens of ¹*Congruus congruus* (McNamara 1994) and ²*Warembia wakefieldi* (Flannery & Pledge 1987), indicate such records can be reliable. McNamara (1997) has also highlighted the need for re-investigation of some material with his work on the small macropodids of South Australia. Closer examination of the wealth of fossil material from the South East has the potential for resolving other issues such as the taxonomic status of the devils (³*Sarcophilus harrisii* and ⁴*S. lamii*), and the question of whether these represent distinct species or sub-species, or the extant species represents a dwarfed form of the larger ³*S. lamii* (Marshall & Corruccini 1978; Dawson 1982; Werdelin 1987). Both have been recorded from sites in the South East. Similarly, the distinction between the koalas *Phascolarctos cinereus* and ²*P. stuarti* has been the topic of discussion (Archer & Hand 1987), and both species are listed for Pleistocene sites of the South East.

Collection biases can be reduced by employing thorough excavation methods and reducing the number of specimens simply collected from sites without regard to provenance. Examination of the data summarised in Table 3 reveals a great number of sites with practically no record of amphibian, reptile, bird or small mammal species and this may be related to collection biases where mainly large bone

material has been collected. Exceptions to this are sites where recovery of small specimens is difficult (e.g. Green Waterhole Cave and swamp sites).

An interesting feature of the South East is the variation in the 'types' of sites (e.g. caves, sinkholes and swamps) within the region. All of the Pleistocene sites in the Naracoorte area, and much of the Upper South East, are cave sites. Swamp sites are found in the Penola and Millicent areas. The Mount Gambier area has cave sites, but also has sinkholes which are unique to this area and are not found in the Upper South East. Obviously the type and morphological features of a site have a direct influence on the species represented in the deposit and this highlights the importance of taphonomic research.

Within the South East region there has been a bias towards sites of the Upper South East, particularly the sites around Naracoorte. This is probably due to the much higher level of research and exploration conducted in this area. Thus, further investigation of the Lower South East region is an important next step to understanding the vertebrate palaeontology of the region as a whole.

Acknowledgments

The authors wish to thank the referees N. Pledge and particularly, A. Baynes for helping greatly to improve the paper, R. Wells and G. Prideaux for commenting on an early draft and for continued guidance with the project. Special thanks go to M. McDowell for help with excavation, site surveying and for allowing us to use his extensive species lists for Wet Cave (5U10) and Robertson Cave (5U17, 5U18, 5U19) and for identifying rodent material from other sites at Naracoorte. We would particularly like to thank N. Pledge, J. McNamara and M. Hutchinson of the South Australian Museum for assisting with information and providing access to the Museum's Palaeontology collection, the staff of the Naracoorte Caves World Heritage area (particularly the Cave Guides) for continued enthusiasm and assistance with the research programme at the Caves, G. Prideaux and S. Bowler for assistance with site surveying and identification of material, L. Easton (previously Turner) for invaluable help with the identification of macropodids from Naracoorte, E. Bailey for help with site and specimen references contained in the Flinders University Vertebrate Palaeontology collection and P. Duenke for assistance with the location of specimens in this collection. Thanks are due to W. Boles of the Australian Museum and J. & P. Bourne of Bool Lagoon for assistance with current bird names. We would also like to thank members of CEGSA for assistance with the location of sites and material, L. Dawson for input on the material from

the site 5U/169 and helpers and students from Flinders University. Thanks to S. Hayter for helping with excavations at Millicent, and to the following landowners for providing access to caves and sites on their property, for taking an active interest in

palaeontological research in the region and for reporting the location of new sites – P. Bird, H. & S. Crawford, P. & R. Freckleton, J. Hole, R. & D. Hooper, R. Hunter & family, B. & B. Johnson, R. & R. Menzel and D. & S. Williamson.

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